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Aerospace Medicine and Biology
A Continuing Bibliography with Indexes

NASA SP-7011(237)
October 1982

National Aeronautics and Space Administration

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A Continuing Bibliography with Indexes

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NASA SP-7011(237)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 237)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in September 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA)*

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 224 reports, articles and other documents announced during September 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA).* The first issue of the bibliography was published in July 1964.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

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An annual index will be prepared at the end of the calendar year covering all documents listed in the 1982 Supplements.

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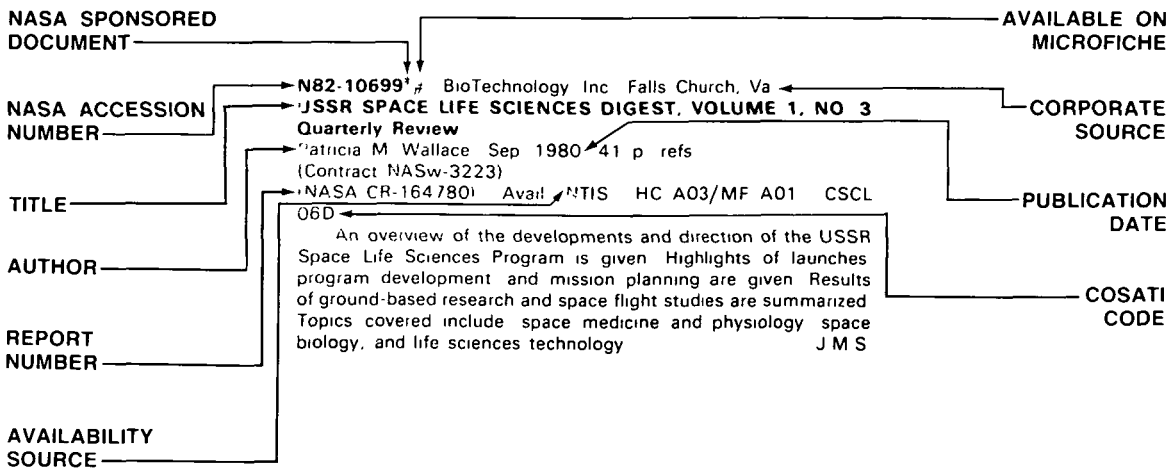

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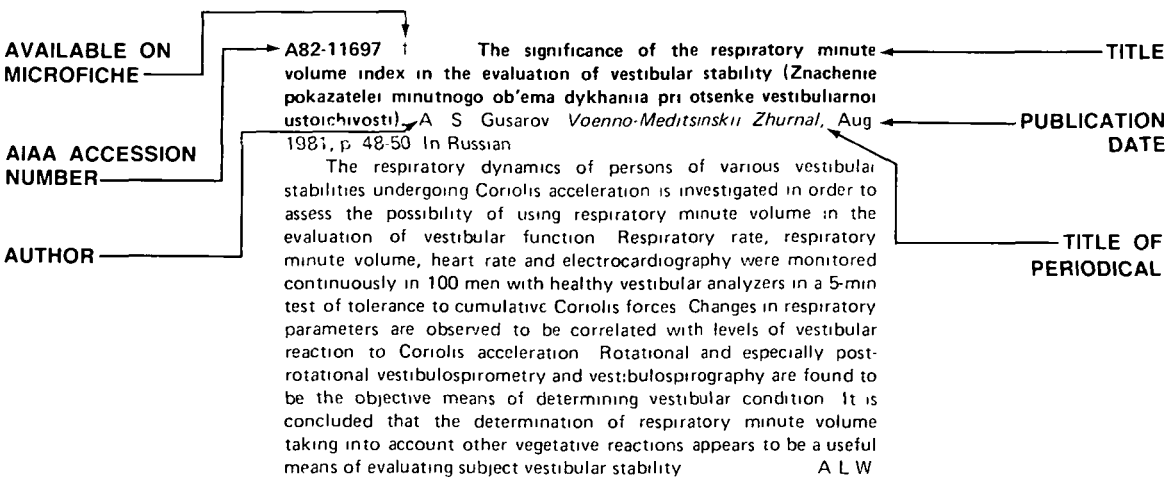

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 237)

OCTOBER 1982

IAA ENTRIES

A82-34965 Simulation of two forms of eye motion and its possible implication for the automatic recognition of three-dimensional objects. A Roy (Zaragoza, Universidad, Saragossa, Spain) and L L Sutro *IEEE Transactions on Systems, Man, and Cybernetics*, vol SMC-12, May-June 198, p 276-288 30 refs

Simulation of two forms of eye motion has been carried out with a view to developing automated means of recognizing regular three-dimensional objects from any direction The visual system includes a binocular graded-resolution video camera assembly, a planner, and a self-command computer The discussion covers the following topics simulation of eye movement in tracking, design of a scan path generating algorithm, simulation of the generation of a scan path, detection and display of edges, design of adjustment-of-fixation algorithm, and simulation of adjustment of fixation V L

A82-34968 Linguistic decision structures for hierarchical systems J H Graham and G N Saridis (Rensselaer Polytechnic Institute, Troy, NY) *IEEE Transactions on Systems, Man, and Cybernetics*, vol SMC-12, May-June 1982, p 325-333 13 refs NSF Grant No ECS-79-16882

The development of a new hierarchical linguistic-based learning control structure for complex systems is described The complete system will be able to interact with a human operator in a high-level language at the highest level of the hierarchy and will be able to control detailed motions of a complex physical system at the lowest level of the hierarchy Each level of the hierarchy is defined by a formal grammar which can generate exactly the class of admissible control actions at that level A new linguistic structure, the linguistic decision schema, is proposed to specify the mapping between linguistic elements in adjacent levels In the most general form, the decision schema incorporates a learning algorithm to obtain asymptotically optimal mappings for control under stochastic environments (Author)

A82-34970 Analysis and classification of human errors in troubleshooting live aircraft power plants. W B Johnson (Illinois, University, Urbana, IL) and W B Rouse (Georgia Institute of Technology, Atlanta, GA) *IEEE Transactions on Systems, Man, and Cybernetics*, vol SMC-12, May-June 1982, p 389-393 12 refs Contract No MDA903-79-C-0421

Two experimental studies were employed to develop and evaluate a scheme for classifying human errors in troubleshooting tasks Both experiments involved trainees in a Federal Aviation Administration (FAA) certificate program in power plant maintenance Each trainee received one of three training methods, two of which were computer-based, and then transferred to troubleshooting live aircraft power plants The transfer data from the first experiment (N = 36) were used to develop the error analysis and classification procedures In addition results of this analysis led to modifications of the training methods The transfer data from the second experiment (N = 22) were employed to evaluate the effects of the changes in training methods Results indicated a decrease in errors due to these changes The development of the methodology is discussed and the resulting behavioral interpretations are presented (Author)

A82-34971 A study on human tracking performance in a complex G field experiment. D W Repperger, D B Rogers, J W Frazier, and R E Van Patten (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH) *IEEE Transactions on Systems, Man, and Cybernetics*, vol SMC-12, May-June 1982, p 393-401 30 refs

Various aspects of analyzing closed-loop tracking error within a phase plane context for a man-machine experiment are investigated A study is conducted on candidate density functions that could characterize such boundaries Using a cumulative distribution function (CDF), a definition of such a boundary is obtained Kolmogorov-Smirnov (K-S) tests are performed on empirical data from an acceleration stress experiment to investigate certain assumptions concerning normality of the distributions of these boundaries (Author)

A82-35248 Signal analysis at the periphery of the auditory system (Analiz signalov na periferii slukhovoi sistemy). Edited by Ia A Al'tman Leningrad, Izdatel'stvo Nauka, 1981 136 p In Russian

Papers are presented on mechanisms of information processing at the peripheral parts of the auditory system Particular consideration is given to the oscillatory properties of cochlea structures, digital simulation of the frequency selectivity of the basilar membrane, statistical methods of signal analysis in the processing of neuroelectrical data, and two-tone inhibition in the peripheral auditory system B J

A82-35272 Human visual orientation. I P Howard (York University, Toronto, Canada) Chichester, Sussex, England and New York, John Wiley and Sons, 1982 704 p 2184 refs $66 50

It is shown how information relevant to judgements about direction and orientation is dealt with in the visual system, starting at the most peripheral level and proceeding to higher levels in the nervous system General concepts and terms are introduced, and theories and terminology are critically appraised Topics discussed include visual acuity and associated optical and retinal mechanisms, neurophysiology of orientation detectors in the visual system, coding of spatial information, the relationship between vision and the vestibular, auditory, and kinaesthetic systems, visual motor coordination, and the judgement of orientation of shapes Suggestions for future research are made C D

A82-35638 * # United States and Soviet Life Sciences factors in long-duration space flights J C Sharp (NASA, Ames Research Center, Moffett Field, CA) In Space manufacturing 4, Proceedings of the Fifth Conference, Princeton, NJ, May 18-21, 1981 New York, American Institute of Aeronautics and Astronautics, 1981, p 403-405

A general review of the Life Sciences issues affecting long-duration manned missions is presented Descriptions and examples of the similarities and differences between the Soviet and U S life sciences programs are discussed (Author)

A82-35639 * # Behavioral and biological interactions with confined microsocieties in a programmed environment. H H Emurian, J V Brady (Johns Hopkins University, Baltimore, MD), J L Meyerhoff, and E H Mougey (U S Army, Walter Reed Army Institute of Research, Washington, DC) In Space manufacturing 4, Proceedings of the Fifth Conference, Princeton, NJ, May 18-21, 1981 New York, American Institute of Aeronautics and Astronautics, 1981, p 407-421 22 refs Grants No NGR-21-001-111, No PHS-DA-00018, Contract No N00014-80-C-0467

This paper presents a summary of the background, objectives, and methodological approach of an ongoing research project devoted to the analysis of individual and small group performance effectiveness under conditions of isolation and confinement during extended residences in a continuously programmed environment A more detailed description is provided of the results of a recent series of experiments designed and conducted to assess hormonal and behavioral effects of a change in group membership and size (Author)

A82-35641 # Influential factors of negative effects in the isolated and confined environment. S R McNeal and B J Bluth (California State University, Northridge, CA) In Space manufacturing 4, Proceedings of the Fifth Conference, Princeton, NJ, May 18-21, 1981 New York, American Institute of Aeronautics and Astronautics, 1981, p 435-442 28 refs

Studies have been conducted on the isolated and confined environment (ICE) in order to identify potential problems for the space traveler Maladaptive characteristics, both physical and psychological in nature, as well as individual and group behavior changes have been identified and it has been shown that the ICE symp-

tomology is very similar to that of stress It is suggested that the ICE acts as a catalyst to other factors of greater influence in the development of negative effects observed in an ICE Stress management is discussed with reference to training, coping strategies, preparedness for social and psychological problems, and alterations of the social and physical environment V L

A82-35651 † Structural changes of the thymus of irradiated animals that were also subjected to heat trauma (Strukturnye izmeneniia timusa obluchennykh zhivotnykh, dopolnitel'no podvergshikhsia termicheskoi travme) R S Budagov (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) *Radiobiologiia*, vol 22, Mar -Apr 1982, p 278, 279 5 refs In Russian

A82-35652 † Investigation of the general fitness of the progeny of irradiated animals. III - The resistance of mice to irradiation, hypoxia, endotoxin, and physical stress (Issledovanie obshchei prisposobленnosti potomstva obluchennykh zhivotnykh. III - Ustoichivost' myshei k oblucheniiu, gipoksii, deistviiu endotoksina, fizicheskim nagruzkam). I E Vorobtsova and K L Gol'zberg (Ministerstvo Zdravookhraneniia SSSR, Tsentral'nyi Nauchno-Issledovatel'skii Rentgeno-Radiologicheskii Institut, Leningrad, USSR) *Radiobiologiia*, vol 22, Mar -Apr 1982, p 261-264 11 refs In Russian

A82-35653 † Protective effect of a gaseous hypoxic mixture under the combined effect on the organism of radiation and physical stress (Zashchitnyi effekt gazovoi gipoksicheskoi smesi pri sochetannom vozdeistvii na organizm radiatsii i fizicheskoi nagruzki) A I Britun, R B Strelkov, N G Kucherenko, and O I Kurochkina (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) *Radiobiologiia*, vol 22, Mar -Apr 1982, p 250-252 13 refs In Russian

A82-35654 † The effect of several pharmacologically active substances on the transformation of cystamine in mouse tissues (Vliianie nekotorykh farmakologicheski aktivnykh veshchestv na prevrashchenie tsistamina v tkaniakh myshei). L G Tarnopol'skaia *Radiobiologiia*, vol 22, Mar -Apr 1982, p 246-250 12 refs In Russian

The effect of mexamine, ethirone, and gutimine on the rate of cystamine transformation in the liver and spleen of white mice was studied It is shown that, administered in combination with cystamine, these preparations decrease the rate of the sulfur-containing radio-protector metabolism It is suggested that radio-protective drugs be produced on the basis of cystamine and include substances that have an effect on the pharmacokinetics of the sulfur-containing component B J

A82-35655 † Possibility of evaluating radiation injury to skin on the basis of changes in its functional state (Vozmozhnost' otsenki luchevogo porazheniia kozhi po izmeneniiu ee funktsional'nogo sostoianiia). V O Sudakova and I A Rappoport *Radiobiologiia*, vol 22, Mar -Apr 1982, p 226-229 14 refs In Russian

Experiments on male rats have shown that the evaluation of the neutralizing capacity of the skin can be used as a quantitative method to study the functional status of the skin, this is the case because this evaluation makes possible an early disclosure of the impairment of the protective function of beta-irradiated skin The neutralizing capacity of the skin is a direct function of the beta-radiation dose and may be a criterion for the prediction and assessment of the severity of radiation dermatitis B J

A82-35656 † Bone-marrow haemopoiesis in dogs exposed to various repeated total-body nonuniform irradiations (Kostnomozgovoe krovetvorenie u sobak pri razlichnykh variantakh povtornykh obshchikh neravnomernykh obluchenii). M P Kalandarova and V G Gorlov *Radiobiologiia*, vol 22, Mar -Apr 1982, p 215-219 9 refs In Russian

Dogs were exposed to total-body nonuniform irradiation, the absorbed doses varying by 2 8 to 8 times and doses on the dog's back amounting to 0 0774 C/kg and 0 01290 C/kg It is shown that, after a three-fold exposure at 90-day intervals between the fractions, a haemopoiesis affection develops which is analogous to that observed in the case of a typical form of radiation sickness induced by a single exposure Long-term hypoplasia and aplasia of the bone marrow and the impairment of postirradiation recovery are indicative of the exhaustion of the haemopoietic resources upon repeated exposure to ionizing radiation B J

A82-35657 † Modeling of the recovery of cells from radiation damage and the principle of effective-dose reduction. I - Models of the recovery of cells after acute irradiation (Modelirovanie protsessov vosstanovleniia kletok ot luchevykh povrezhdenii i printsip umen'sheniia effektivnoi dozy I - Modeli vosstanovleniia kletok pri ostrom obluchenii). A D Andreev and Iu A Kutlakhmedov (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii Rastenii, Kiev, Ukrainian SSR) *Radiobiologiia*, vol 22, Mar -Apr 1982, p 187-193 12 refs In Russian

A82-35658 † Comparative evaluation of the efficiency of radio-protectors on the basis of criteria of the protection of bone marrow and the gastrointestinal tract (Sravnitel'naia otsenka effektivnosti radioprotektorov po kriteriiam zashchity kostnogo mozga i zheludochno-kishechnogo trakta). N N Piatovskaia and I E Brumberg (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) *Radiobiologiia*, vol 22, Mar -Apr 1982, p 183-186 14 refs In Russian

Gamma-ray experiments on mice have shown that, unlike cystamine, 4-aminobenzo-2,1,3-thiadiazol has a radio-protective effect on the haemopoietic tissue and fails to protect the gastrointestinal tract In the bone marrow, this preparation is effective only in regard to stem cells B J

A82-35659 † Investigation of the radio-protective effect of cystamine on a model of thermally induced prophage lambda (Izuchenie radiozashchitnogo deistviia tsisteamina na modeli termoindutsiruemogo profaga lambda) S E Bresler, V L Kalinin, and I N Suslova (Akademiia Nauk SSSR, Leningradskii Institut Iadernoi Fiziki, Gatchina, USSR) *Radiobiologiia*, vol 22, Mar -Apr 1982, p 176-182 12 refs In Russian

Lethal and mutagenic effects of Co-60 gamma rays on the prophage lambda c 1857 in lysogenic E coli cells AB1186 uvrA6 and AB2463 recA13 after irradiation in the absence or in the presence of cystamine (0 05 M) were investigated Cystamine was found to produce a marked radio-sensitizing effect, with the prophage thermally induced immediately after irradiation (DMF = 1 5) In this case, the yield of gamma-radiation-induced c-mutations was significantly higher in the presence of cystamine than in its absence in AB1186 but not in AB2463 (which was deficient in SOS repair) When the prophage was thermally induced after 90 minutes of postirradiation incubation in broth neither the survival nor the yield of c-mutations depended on the presence of cystamine at the time of exposure or on the presence of the recA+ gene product B J

A82-35660 † Investigation by means of a fluorescent probe of changes in cellular membranes of fibroblasts of the Chinese hamster under laser and X-ray irradiation (Issledovanie izmenenii kletochnykh membran fibroblastov kitaiskogo khomiachka pri lazernom i rentgenovskom obluchenii akh s pomoshch'iu fluorestsentnogo zonda). A K Abdvakhitova, I M Parkhomenko, and T N Sokolova (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) *Radiobiologiia*, vol 22, Mar -Apr 1982, p 155-159 11 refs In Russian

A82-35661 † Structural changes of the plasmatic membrane under the effect of ionizing radiation (Strukturnye izmeneniia plazmaticheskoi membrany pod deistviem ioniziruiushchei radiatsii) B S Fomenko and I G Akoev (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) *Uspekhi Sovremennoi Biologii*, vol 93, Mar -Apr 1982, p 183-195 137 refs In Russian

A82-35662 † Kainic acid as a tool in brain research (Kainovaia kislota - sredstvo issledovaniia golovnogo mozga). I A Sytinskii (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) and V S Turovskii (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) *Uspekhi Sovremennoi Biologii*, vol 93, Mar -Apr 1982, p 253-269 123 refs In Russian

Data are presented on the neurotoxicity of L-kainic acid, a structural analog of L-glutaminic acid, and the use of kainic acid as a specific tool in neurobiological research is discussed Kainic acid destroys nerve cells in the injection zone without any damage to axons having endings in this particular part of the brain or extending across it The specific effect of kainic acid is used for determining neuroanatomical connections and neurochemical indices of functional systems located in specific portions of the brain as well as for identifying changes in animal behavior due to nerve damage V L

A82-35663 † Evolutionary significance of the adaptation of animals to heat (Evoliutsionnoe znachenie temperaturnykh adaptatsii zhivotnykh). B P Ushakov (Akademiia Nauk SSSR, Institut Tsitologii, Leningrad, USSR) *Uspekhi Sovremennoi Biologii*, vol 93, Mar -Apr 1982, p 302-319 36 refs In Russian

The ability of a population as a whole to achieve physiological homeostasis aimed at preserving the population size and genetic structure in the case of a rise in temperature to a dangerous level is discussed Physiological homeostasis of a population is realized through a reactive increase in the thermal stability of individual animals in response to an increase in ambient temperature While the reactive increase in thermal stability results in reduced elimination of individuals, it also leads to reduced efficiency of selection due to heat This may result in insufficiently selective or completely nonselective death of individuals V L

A82-35664 † Early diagnosis of overstrain of the cardiovascular system in athletes engaging in cyclic forms of sport (Ranniaia diagnostika perenapriazheniia serdechno-sosudistoi sistemy u sportsmenov tsiklicheskikh vidov sporta). V G Kukes, V A Siluianova, S N Popov, E V Sokova, B R Al'perovich, V V Gorodetskii, A M Alaverdian, and L S Blistanova (I Moskovskii Meditsinskii Institut, Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) *Sovetskaia Meditsina*, no 4, 1982, p 18-21 20 refs In Russian

The effects of a beta blocker on values of the general work capacity, gas exchange, acid-alkali balance, lactic acid level, and central body temperature were studied in 74 athletes subjected to a bicycle-ergometer exercise until fully tired A vegetative-provision tension (VPT) manifested itself in a marked economizing effect of the drug on these parameters It is shown that negative EKG changes in response to this effect are associated with the VPT syndrome The elevated VPT which is accompanied by energy losses in the form of heat may lead to the development of dystrophic changes in the myocardium B J

A82-35665 † **The combined effect of medicines (Kombinirovannoe deistvie lekarstvennykh veshchestv).** A N Kudrin (I Moskovskii Meditsinskii Institut, Moscow, USSR) *Sovetskaia Meditsina*, no 4, 1982, p 89-94 17 refs In Russian

Several mechanisms of the combined effect of drugs on the human body are examined These include (1) the direct interaction of drug molecules with one another, (2) the change in the pharmacokinetic properties of drugs, (3) metabolic incompatibility, (4) the competition of drugs for sites of binding with biomolecules, and (5) changes of the pharmacodynamics of drugs B J

A82-35666 † **Changes of the oxygen transport function of the blood and some metabolic values in patients with hypertension and chronic ischemic heart diseases during ergometric exercise (Izmenenie kislorodtransportnoi funktsii krovi i nekotorykh pokazatelei metabolizma u bol'nykh gipertonicheskoi bolezn'iu i khronicheskoi ishemicheskoi bolezn-'iu serdtsa pri ergometrii).** V N Popova, I L Beketova, B A Malikov, and L A Evstigneeva (II Moskovskii Meditsinskii Institut, Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR) *Vrachebnoe Delo*, Apr 1982, p 56-61 In Russian

A82-35667 † **The determination of capillary resistance (Ob opredelenii rezistentnosti kapilliarov).** L K Dzhogan (Ministerstvo Zdravookhraneniia SSSR, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Gigieny i Toksikologii Pestitsidov, Polimernykh i Plasticheskikh Mass, Kiev, Ukrainian SSR) *Vrachebnoe Delo*, Apr 1982, p 64-66 8 refs In Russian

An objective method for studying the durability and permeability of capillaries in the skin is presented The method is based on electrical pumping and a vacuum manometer to create a negative pressure of a known magnitude over an area of skin in the lower third of the forearm, computation of the quantity of petechiae produced allows the estimation of capillary resistance Use of the present method in the evaluation of workers in forestry and the woodworking industry exposed to formaldehyde and styrene has demonstrated its usefulness in monitoring the course of treatment for contact dermatitis A L W

A82-35668 † **Investigation of the functional state of the central nervous system and the motor apparatus for various regimes of rest and physical exercise (Issledovanie funktsional'nogo sostoianiia ts. n. s. i dvigatel'nogo apparata v usloviiakh razlichnykh rezhimov otdykha i fizicheskoi nagruzki).** P L Levakovskii (Lutskii Gosudarstvennyi Pedagogicheskii Institut, Lutsk, Ukrainian SSR) *Teoriia i Praktika Fizicheskoi Kul'tury*, Apr 1982, p 31 In Russian

A82-35669 † **Dynamics of blood flow rate in athletes upon changes in environmental conditions (Dinamika skorosti krovotoka u sportsmenov pri izmenenii uslovii uneshnei sredy)** P K Prusov, N G Kartashov, and N K Snesarev (Vitebskii Oblastnoi Vrachebno-Fizkul'turnyi Dispanser, Vitebsk, Belorussian SSR) *Teoriia i Praktika Fizicheskoi Kul'tury*, Apr 1982, p 29-31 7 refs In Russian

The response of the blood flow rate of athletes and its daily and seasonal variation to changes in environmental and geographical conditions is investigated The method of oxyhemometry was used to assess blood flow rates in the pulmonary-aural circulatory branch in adult track and field athletes under lowland conditions and in the 23 days following ascent to 1600 m altitude, and in swimmers aged 11 to 12 having relocated from their homes in the European part of the Soviet Union to Sakhalin Island Blood flow is observed to accelerate in the initial period of altitude acclimatization, in geographically acclimatized persons in the winter and spring-summer periods, and following exercise training conducted for several days in a row Blood flow slows during the period of reacclimatization to lowland conditions, and in the morning hours as compared with the evening The demonstrated variability of blood flow rate is thus concluded to be a factor which must be taken into account in the evaluation of the state of training of an athlete S C S

A82-35670 † **Characteristics of hemapoiesis in athletes undergoing endurance-training (Osobennosti krovetvoreniia u sportsmenov, treniruiushchikhsia na vynoslivost').** L A Matvienko (Gomel'skii Politekhnicheskii Institut, Gomel, Belorussian SSR) *Teoriia i Praktika Fizicheskoi Kul'tury*, Apr 1982, p 27-29 5 refs In Russian

A82-35671 † **Variation of the biomechanical characteristics of an 800-m run under the influence of fatigue (Izmenenie biomekhanicheskikh kharakteristik bega na 800m pod vliianiem utomleniia)** V V Tiupa, Iu G Travin, F A Guseinov, and F P Riabintsev (Moskovskii Institut Narudnogo Khoziaistva, Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) *Teoriia i Praktika Fizicheskoi Kul'tury*, Apr 1982, p 20-23 9 refs In Russian

A82-35672 † **Discriminative biomechanical characteristics in middle-distance running (Diskriminativnye biomekhanicheskie kharakteristiki pri bege na srednie distantsii).** V M Zatsiorskii, N A Iakunin, and N G Mikhailov (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) *Teoriia i Praktika Fizicheskoi Kul'tury*, Apr 1982, p 14-17 19 refs In Russian

The mechanical energy expended by middle-distance runners of varying ability is determined The way in which the biomechanical characteristics (in particular, of vertical, horizontal, and total external mechanical work) change during middle-distance running is described It is found that when long strides are taken and high speeds are involved, runners of great ability expend considerably less energy in displacing 1 kg of weight through 1 m than runners of lesser ability Running 1,000 m entails an insignificant increase in the vertical work and moderate changes in the horizontal work performed C R

A82-35673 † **Specialized laboratory for the educational and research activity of students and the psychodiagnostic study of athletes (Spetsializirovannaia laboratoriia dlia uchebno-issledovatel'skoi raboty studentov i psikhodiagnosticheskogo obsledovaniia sportsmenov).** A G Barabanov, O N Mazurov, S V Sumerkin, and S G Shinkarev (Krasnodarskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Krasnodar, USSR) *Teoriia i Praktika Fizicheskoi Kul'tury*, Apr 1982, p 48, 49 In Russian

A82-35674 † **An empirical equation of elementary motion (Empiricheskoe uravnenie elementarnogo dvizheniia).** P N Khlomenok, Zh K Kholodov, and A P Khlomenok (Moskovskii Oblastnoi Gosudarstvennyi Institut Fizicheskoi Kul'tury, Moscow, USSR) *Teoriia i Praktika Fizicheskoi Kul'tury*, Apr 1982, p 12-14 14 refs In Russian

An approach based on the black box method is used to obtain an empirical equation describing the motion of man The approach involves experimental determination of the temporal characteristics of the repeated motion of man, selection, with the aid of an analog computer, of a simple model with the same temporal characteristics, mathematical description of the model, i e , derivation of an empirical equation, and validation of the equation The study has yielded a model described by a second-order linear differential equation with a delay term The model can be used in simulators and for complex motion synthesis V L

A82-35676 † **The diagnosis and treatment of heart-rhythm disorders - The role of intracardial electrophysiological investigation (Diagnostika i lechenie narushenii ritma serdtsa - Rol' metoda vnutriserdechnogo elektrofiziicheskogo issledovaniia)** A S Smetnev, S P Golitsyn, and S F Sokolov (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Kardiologiia*, vol 22, May 1982, p 38-42 12 refs In Russian

Studies of electrophysiological mechanisms and diagnostic criteria for the more frequent reciprocal tachycardias are discussed sino-atrial, atrial, atrioventricular nodal, tachycardias in Wolff-Parkinson-White syndrome, ventricular tachycardia, and rhythm disorder caused by automatic activity of the ectopic focus The problem of assessing antiarrhythmic drugs is examined, along with the problem of the differentiated treatment of rhythm disorders Finally, the role of electrophysiological studies in the choice of individual medicinal therapy for patients with heart arrhythmis is considered B J

A82-35677 † **The role of stress in the pathogenesis of ischemic heart disease (Rol' stressa v patogeneze ishemicheskoi bolezni serdtsa).** F Z Meerson, M G Pshennikova, and A A Ugolev (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Kardiologiia*, vol 22, May 1982, p 54-61 47 refs In Russian

A82-35678 † **The first clinical experience with a new Soviet antiarrhythmic drug, the diethylamine analog of ethmosine, in patients with different disorders of the heart rhythm (Pervyi opyt klinicheskogo primeneniia novogo otechestvennogo antiaritmicheskogo preparata - dietilaminovogo analoga etmozina - u bol'nykh s razlichnymi narusheniiami ritma serdtsa)** Kh Kh Shugushev, A S Smetnev, L V Rozenshtraukh, and N V Kaverina (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Kardiologiia*, vol 22, May 1982, p 71-75 In Russian

A82-35679 † **The effect of nitroglycerine on the functional state of the left ventricle in patients with acute myocardial infarction according to ultrasonic studies of the heart (Vliianie nitroglitserina na funktsional'noe sostoianie levogo zheludochka u bol'nykh ostrym infarktom miokarda po dannym ul'trazvukovogo issledovaniia serdtsa)** L O Ivanishvili and I Iu Ashmarin (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Kardiologiia*, vol 22, May 1982, p 91-96 25 refs In Russian

A82-35680 † Recent developments in assessing the myocardial dystrophy encountered in athletes as a consequence of chronic physical overexertion (Novoe v otsenke distrofii miokarda vsledstvie khronicheskogo fizicheskogo perenapriazheniia u sportsmenov). E V Zemtsovskii and A A Uderman (Institut Fizicheskoi Kul'tury, Leningrad, USSR) *Kardiologiia*, vol 22, Apr 1982, p 20-23 9 refs In Russian

It is noted that the diagnosis of myocardial dystrophy in athletes is at present based exclusively on electrocardiographic criteria, that is, on detecting irregularities in the repolarization of heart ventricles It is pointed out, however, that athletes subjected to extremely demanding regimens can develop heart rhythm disorders, the most common of which are extrasystole and arrhythmia of the 'suppressed sinoatrial node' Since studies have shown that repolarization irregularities are often accompanied by heart rhythm disorders, it is thought that the latter may indicate myocardial dystrophy The various types of dystrophy, which differ from one another in the changes that occur in the function and shape of the myocardium, are discussed Attention is also given to the similarity in the changes that occur in indicators of myocardial shape and heart rhythms during ventricle repolarization irregularities and extrasystole and migration of the rhythm leader The possibility of interpreting these irregularities in rhythm as symptoms of myocardial dystrophy is considered C R

A82-35681 † Electrocardiographic diagnosis of the chronic pulmonary heart (Elektrokardiograficheskaia diagnostika khronicheskogo legochnogo serdtsa). L N Matveev (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR) *Kardiologiia*, vol 22, Apr 1982, p 26-30 17 refs In Russian

A82-35682 † The pharmocokinetic characteristics of trimecain as compared to lidocain in patients with myocardial infarction (Farmakokineticheskie kharakteristiki trimekaina v sravnenii s lidokainom u bol'nykh infarktom miokarda) V K Piotrovskii, E B Smirnova, O S Riabokon', and V I Metelitsa (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Kardiologiia*, vol 22, Apr 1982, p 62-65 6 refs In Russian

A82-35683 † Mechanisms of the development of hypersensitivity to strophanthin in experimental myocardial infarction and its pharmacological correction (Mekhanizmy razvitiia giperchuvstvitel'nosti k strofantinu pri eksperimental'nom infarkte miokarda i ee farmakologicheskaia korrektsiia). E I Gendenshtein and L N Sernov (Mordovskii Gosudarstvennyi Universitet, Saransk, USSR) *Kardiologiia*, vol 22, Apr 1982, p 65-69 15 refs In Russian

A82-35684 † Rare cases of serious disturbances in cardiac rhythm during a hypoxic functional test (O redkikh sluchaiakh tiazhelykh narushenii ritma serdtsa pri gipoksicheskoi funktsional'noi probe). V B Malkin and V I Plakhatniuk *Kardiologiia*, vol 22, Apr 1982, p 92-95 23 refs In Russian

Cases of reversible heart stoppage in persons undergoing hypoxia at simulated altitude to measure cardiovascular adaptive capabilities are presented Tests were performed on apparently healthy men breathing a hypoxic gas mixture at a simulated altitude of 5000 m while EKGs, arterial pressure, EEGs, respiratory rate and general condition were monitored In about 6% of the subjects examined, physiological changes characteristic of unstable, ineffective adaptation were found, which were marked in about 3% by a pronounced bradycardia and disturbances in heart rhythm In rare cases, sinus bradycardia was accompanied by ventricular asystole lasting from 3 to 34 sec Sinus rhythm was restored by oxygen breathing in all but one case, where fibrillation developed Sinus bundle arrest was also observed following sinus arhythmia at a normal heart rate The disturbances are attributed to a breakdown in neurohumoral regulation under conditions of reduced hypoxia tolerance The occurrence of the serious instances in apparently healthy subjects is argued to require the presence of a specially trained physician to stop the test and provide immediate aid in such situations S C S

A82-35687 † Cultivation of the luminescent bacterium Photobacterium leiognathi with control by luminescence (Kul'tivirovanie svetiashchikhsia bakterii Photobacterium leiognathi s regulirovaniem liuminestsentsii) V V Zavoruev and V V Mezhevikin (Akademiia Nauk SSSR, Institut Fiziki, Krasnoyarsk, USSR) *Mikrobiologiia*, vol 51, Mar -Apr 1982, p 224-229 8 refs In Russian

A82-35688 † State of the hearing function in diesel locomotive crewmen (Sostoianie slukhovoi funktsii u pabotnikov teplovoznykh brigad). M M Buzinnik, V P Nechiporenko, G F Boiarskii, and V F Chumakov (Donetskii Meditsinskii Institut, Donetsk, Kievskii Gosudarstvennyi Institut Usovershenstvovaniia Vrachei, Yasinovataya, Ukrainian SSR) *Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezneі*, Mar -Apr 1982, p 17-20 6 refs In Russian

A82-35689 † The use of trenthalum in acute vestibulocochlear disorders in patients with meningococcal infection (Primenenie trentala pri ostrykh vestibulo-kokhlearnykh narusheniiakh u bol'nogo s meningokokovoi infektsiei). R M Shaimardanov (Kuibyshevskii Meditsinskii Institut, Kuibyshev, USSR) *Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezneі*, Mar -Apr 1982, p 76, 77 In Russian

A82-35690 † Postural vertigo as a specific symptom of Meniere's disease (Pozitsionnoe golovokruzhenie kak osobennost' proiavleniia bolezni Men'era). G G Lapshina (Kuibyshevskii Meditsinskii Institut, Kuibyshev, USSR) *Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezneі*, Mar -Apr 1982, p 75, 76 In Russian

A82-35691 † Classification of vestibular disorders as a function of the phase of the disease and the degree of vestibular compensation (Klassifikatsiia vestibuliarnykh narushenii v zavisimosti ot fazy bolezni i stepenii kompensatsii vestibuliarnoi funktsii). N S Blagoveshchenskaia (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezneі*, Mar -Apr 1982, p 57-63 7 refs In Russian

Consideration is given to factors other than the site of the lesion affecting the symptomology of vestibular disorders On the basis of clinical evidence, it is shown that the severity of vestibular symptoms depends to a significant extent on the phase of the disease, whether acute, subacute, chronic or residual, and on the degree of compensation Vestibular disorders are then divided into three groups as a function of these factors (1) the decompensated stage with the predominance of whole brain stem vestibular symptoms, found in coma and the recovery from coma (2) the decompensated state with the predominance of vestibular symptoms, in which an asymmetry is noted in vestibular tests and vestibulo-autonomic and vestibulo-sensory reactions are elevated, and (3) the compensated state, where vestibular reactions are symmetrical, experimental nystagmus is inhibited or normalized, and vestibulo-autonomic and vestibulosensory reactions are reduced It is noted that whereas central vestibular syndromes may fall into any of the above classifications, peripheral vestibular syndromes are restricted to the latter two S C S

A82-35692 † The use of nondamping sinusoidal rotation in the study of vestibular function (O primenenii nezatukhaiushchego sinusoidal'nogo vrashcheniia dlia issledovaniia vestibuliarnoi funktsii) E V Lapaev and O A Vorob'ev *Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezneі*, Mar -Apr 1982, p 11-17 25 refs In Russian

The qualitative and quantitative characteristics of nystagmus induced in healthy persons by nondamping sinusoidal rotation are examined Horizontal nystagmus was measured by electronystagmometry in 49 subjects aged 25 to 45 experiencing sinusoidal rotation in a rotating chair programmed for various angular velocities and accelerations At rotation periods greater than 10 sec, the change in nystagmus direction is observed to occur before the pause between rotation in opposite directions, with the magnitude of the phase advance proportional to the rotational period A definite asymmetry in the phase advance is observed in normal subjects, and a more marked asymmetry in persons with certain disorders It is concluded that tests with nondamping sinusoidal rotation provide an additional means for characterizing the phase relation between the nystagmus reaction and the stimulus, allowing the study of vestibular function S C S

A82-35693 † Characteristics of brain electric activity in different otoneurologic syndromes with vestibular asymmetry (Kharakteristika mozgovoi elektricheskoi aktivnosti pri razlichnykh otonevrologicheskikh sindromakh, protekaiushchikh s vestibuliarnoi assimmetriei). Kh Kolchev (Bulgarska Akademiia na Naukite, Tsentralna Laboratoriia za Izuchavane na Moz'ka, Sofia, Bulgaria) and Zh Vasileva (Meditsinska Akademiia, Sofia, Bulgaria) *Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezneі*, Mar -Apr 1982, p 8-11 9 refs In Russian

A82-35694 † Some questions open to discussion in clinical labyrinthology (Nekotorye diskussionnye voprosy klinicheskoi labirintologii). V S Olisov (Leningradskii Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad, USSR) *Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezneі*, Jan -Feb 1982, p 53-59 45 refs In Russian

Various aspects of the clinical characteristics and course of dysfunctions of the labyrinth organs of the inner ear are discussed Four principle classes of labyrinthine disturbances - acute, primarily nonrecurring labyrinthine attacks, recurring episodes of vertigo termed Meniere's disease or syndrome, short-duration episodes of vertigo triggered by specific circumstances, and positional vertigo are distinguished, and questions as to the nature, existence and etiology of Meniere's disease and Meniere's syndrome are considered Attention is then given to cochleo-vestibular disturbances of peripheral origin, and the merits of the two sets of terms used to describe such conditions, i e labyrinthopathy and vestibular or cochleo-vestibular syndrome, are discussed Further efforts necessary to achieve an acceptable classification system for labyrinthine disorders are then indicated S C S

A82-35695 † Synchronized nystagmus calibrator (Sinkhronizirovannyi kalibrator nistagma). I B Soldatov, L N As'kova, and R M Shaimardanov

(Kuibyshevskii Meditsinskii Institut, Kuibyshev, USSR) *Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezner,* Jan -Feb 1982, p 76, 77 5 refs In Russian

A synchronized nystagmus calibrator is proposed in which neon lamps light up intermittently at intervals continuously adjustable from 1 to 4 sec, the calibrator can also be used with the central lamp remaining lit High precision in the operation of the instrument, essentially a symmetric long-pulse multivibrator, is achieved by using a stabilized power source The continuous adjustment feature makes it possible to synchronize the lighting of the lamps with periodic changes in the corneoretinal potential by adjusting the lamp switching period in accordance with the chart recorder motion V L

A82-35696 † Affections of the upper respiratory tracts in transport-fleet sailors and the prophylaxis of these affections on long voyages (Zabolevaniia verkhnikh dykhatel'nykh putei u moriakov transportnogo flota i ikh profilaktika v dal'nem plavanii). A I Akulinin, V D Dragomiretskii, L M Shafran, and O V Diumin (Odesskii Meditsinskii Institut, Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Gigieny Vodnogo Transporta, Odessa, Ukrainian SSR) *Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezner,* Jan -Feb 1982, p 35-40 12 refs In Russian

A82-35697 † Caloric methods for stimulation of the vestibular apparatus /Survey of the literature/ (Kaloricheskie sposoby stimuliatsii vestibuliarnogo apparata /Obzor literatury/) V I Pivnikas *Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezner,* Jan -Feb 1982, p 80-85 64 refs In Russian

A82-35698 † A day off in space (Vykhodnoi den' v kosmose) P Pelekhov (Gosteleradio SSSR, USSR) *Soviet Soiuz,* Apr 1982, p 20, 21 In Russian

The ways in which cosmonauts arrange their personal time off from space tasks aboard the Salyut space stations are described Attention is given to the frequent disruptions of rest time that characterize space flight, the choice of some cosmonauts to perform space tasks during their personal time, and housekeeping activities B J

A82-35700 † Blood circulation in weightlessness (Krovoobrashchenie v nevesomosti) O G Gazenko and A M Genin *Zdorov'e,* no 4, 1982, p 10, 11 In Russian

The characteristics of blood circulation under conditions of weightlessness are discussed The effects of normal gravity on the circulatory system are first considered, with particular attention given to the gravitational distention of vascular walls and the necessary increase in blood volume to fill the expanded vessels The absence of gravity is then shown to be accompanied by a contraction of the distended vessels in the lower extremities, the loss of the hydrostatic blood store and the shift of blood and intercellular fluids to the upper part of the body, resulting in an impairment in cerebral circulation, increased load on the right ventricle and an increased risk of pulmonary insufficiency Mechanisms of decreasing circulating blood volume under weightless conditions are then examined, and it is noted that disturbances of hemodynamics have not posed any serious dangers to space flights Finally, adaptations in hemodynamics necessary upon return to earth following an extended-duration space flight are discussed along with methods used in flight to prevent hemodynamic disturbances A L W

A82-35768 Conditioned tilt naming - A modified absolute judgment method is used to measure the oblique effect E Matin, A Drivas, and V Valle (Long Island University, Greenvale, NY) *Perception and Psychophysics,* vol 31, no 5, May 1982, p 421-428 25 refs Grant No NIH-R01-EY-02951

Two naive human observers were conditioned to report on the slant of a 3 8-cpd sinusoidal grating viewed monocularly with a light-adapted eye and presented at various orientations extending from -45 to +135 deg The procedures used yielded a baseline measure of performance and measures obtained during conditioning, extinction, and reconditioning of the tilt-naming response Both subjects learned rapidly, achieving a level of performance that permits efficient measurement of meridional differences in perceived orientation (the oblique effect) at a large number of angles (Author)

A82-35769 * Mass estimation and discrimination during brief periods of zero gravity H E Ross (Stirling, University, Stirling, Scotland) and M F Reschke (NASA, Johnson Space Center, Neuroscience and Behavior Laboratory, Houston, TX) *Perception and Psychophysics,* vol 31, no 5, May 1982, p 429-436 30 refs Research supported by the Medical Research Council of England

Under zero gravity, the gravitational cues to mass are removed, but the inertial cues remain A sensation of heaviness is generated if objects are shaken, and hence given a changing acceleration A magnitude estimation experiment was conducted during the 0-G phase of parabolic flight and on the ground, and the results suggested that objects felt lighter under 0 G than under 1 G Mass discrimination was also measured in flight, and yielded Weber fractions of 18 under 0 G, 16 under 1 8 G, and 09 under 1 G Poor performance under microgravity and macrogravity was probably due mainly to lack of time for adaptation to changed G levels It is predicted that discrimination should improve during the course of prolonged spaceflight, and that there should be an aftereffect of poor discrimination on return to earth (Author)

A82-35809 The measurement of heart rate variability spectra with the help of a personal computer. O Rompelman, C J Van Spronsen (Delft, Technische Hogeschool, Delft, Netherlands), and J B I M Snijders (Staatsbedrijf der Posterijen, Telegrafie en Telefonie, Leidschendam, Netherlands) *IEEE Transactions on Biomedical Engineering,* vol BME-29, July 1982, p 503-510 14 refs

The analysis of fluctuations in heart rate or heart rate variability (HRV) has found applications in, among others, the study of the neural cardiovascular system and ergonomic psychology In particular, the study of the frequency components of HRV is becoming increasingly important A method for the computation of HRV spectra directly from the heart beat event series as derived from the electrocardiogram has been developed Because of the computational efficiency achieved, this method is implemented on a personal computer Apart from an external QRS detector, a completely stand-alone system is realized User interaction takes place on a menu card display basis The system can operate at both real time and up to eightfold increased speed The resultant spectra are displayed as histograms Different ways of smoothing and segment averaging are possible (Author)

A82-35810 Measurement of eye movement with a ferromagnetic contact ring. Y Y Zeevi and J Ish-Shalom (MIT, Cambridge, MA) *IEEE Transactions on Biomedical Engineering,* vol BME-29, July 1982, p 511-522 14 refs Research supported by the United States-Israel Binational Science Foundation, Technion - Israel Institute of Technology, and Massachusetts Institute of Technology

A new magnetic method for measurement of eye movement is presented It is based on measurement of differential inductance variations of two C-shaped coils due to the movement of a conical ferromagnetic ring which fits on the sclera High sensitivity over a wide dynamic range is obtained by using a tuned bridge and synchronous detector Separation of the detector coils from the magnetic field source improves the resolution and stability, and enables a two-dimensional measurement with one pair of C-coils (Author)

A82-35811 Auditory perception of radio-frequency electromagnetic fields. C -K Chou, A W Guy (Washington, University, Seattle, WA), and R Galambos (California, University, La Jolla, CA) *Acoustical Society of America, Journal,* vol 71, June 1982, p 1321-1334 55 refs U S Department of Education Grant No G0080003029, Contract No N00014-80-C-0354

Absorption of pulsed microwave energy can produce an auditory sensation in human beings with normal hearing The phenomenon manifests itself as a clicking, buzzing, or hissing sound depending on the modulatory characteristics of the microwaves While the energy absorbed and the resulting increment of temperature per pulse at the threshold of perception are small, most investigators of the phenomenon believe that it is caused by thermoelastic expansion In this paper, literature that describes psychological, behavioral, and physiological observations as well as physical measurements pertinent to the microwave-hearing phenomenon is reviewed (Author)

A82-35826 † Physiological adaptations and maintenance of vegetative homeostasis (Fiziologicheskie adaptatsii i podderzhanie vegetativnogo gomeostaza). A D Slonim (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR) *Fiziologiia Cheloveka,* vol 8, May-June 1982, p 355-361 41 refs In Russian

The current status of the theory of physiological adaptations is reviewed, and the basic premises underlying the study of such adaptations are examined Attention is given to two fundamental mechanisms for the formation of stability nonspecific, associated with the appearance of stress reaction, and specific, characterized by an increase and mutual substitution of functions maintaining homeostasis at all levels of physiological integration Energy sources for adaptation and the involvement of systems of the organism in individual increases of stability are examined A global energy factor of adaptation, applicable to the main physicogeographical regions, is developed B J

A82-35827 † A classification of behavioral adaptation (Klassifikatsiia povedencheskoi adaptatsii) V I Medvedev (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) *Fiziologiia Cheloveka,* vol 8, May-June 1982, p 362-374 10 refs In Russian

A classification of the types of the behavioral adaptation of man is presented and briefly explained Four main classes of such adaptation are delineated (1) preventive (including overall change of activity, avoidance reaction, and active search for a preferendum), (2) stabilizational (including the conservation of the general structure of behavior and changes of the structure of behavior), (3) socially conditioned forms of behavior, and (4) psychologically conditioned forms of behavior (individual and group) B J

A82-35828 † Human adaptation in arid regions (Adaptatsiia cheloveka v aridnoi zone) F F Sultanov and A I Freink (Akademiia Nauk

Turkmenskoi SSR, Ashkhabad, Turkmen SSR) *Fiziologiia Cheloveka*, vol 8, May-June 1982, p 375-388 35 refs In Russian

Mechanisms of human adaptation to desert conditions are examined on the basis of a systems analysis of the complex of reactions developing under the effect of the natural climatic factors of the arid region on the organism Groups of specific and nonspecific elements of urgent protection against overheating in desert conditions are delineated, and the interaction of these groups of elements is considered The separation of factors into primary (directed at protection against overheating) and secondary (directed at the compensation of the effect of primary factors) makes possible a more adequate evaluation of the degree of adaptability of physiological processes in arid regions A classification is presented of methods of acclimatization in arid regions, with allowance for the underlying physiological mechanisms B J

A82-35829 † Stages of the adaptation of human lungs in conditions of the Far North (Stadii adaptatsii legkikh cheloveka v usloviiakh Krainego Severa) A P Avtsyn and A P Milovanov (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Fiziologiia Cheloveka*, vol 8, May-June 1982, p 389-398 51 refs In Russian

A survey is presented of studies of respiratory adaptation to Arctic conditions Several stages of adaptation are delineated which depend on various levels of bronchial permeability, ventilation, ventilation-perfusion relationships, and systolic pressure of the lung artery system the stage of adaptive strain of the lungs (the first three to six months of living in the Far North), the stage of stabilization (after one-and-one-half to three years), the stage of adaptedness (three to ten or fifteen years), and the stage of deadaptation (which can occur during any of the aforementioned stages) Problems of developing a terminology for describing respiratory adaptation to Arctic conditions are considered, and possible future directions of Arctic pulmonology are discussed B J

A82-35830 † Regional changes of pulmonary functions in inhabitants of the North (Regionarnye izmeneniia funktsii legkikh u zhitelei Severa) L N Matveev, A G Marachev, and S N Medvedev (Moskovskii Meditsinskii Stomatologicheskii Institut, Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Fiziologiia Cheloveka*, vol 8, May-June 1982, p 399-406 36 refs In Russian

Tetrapolar rheopneumopulmonography was used to study ventilation and pulmonary circulation in 249 healthy persons 162 from the northeastern USSR and 87 from Moscow It is found that northerners, compared to Muscovites, have increased perfusion and ventilation of the middle zones constituting the functional reserve of the lungs, along with a decrease in the ventilation volume of the lower zones Morphometric studies have shown a hypertrophy of the muscle layer at various bronchial levels It is suggested that an increase in the volume of bronchial blood circulation is directed at the maintenance of the temperature-control effect of the respiratory tract B J

A82-35831 † The bioenergetics of erythrocytes in inhabitants of the North (Bioenergetika eritrotsitov u zhitelei Severa) A G Marachev, V I Sorokovoi, A V Kornev, L N Matveev, E P Brusovanik, and L N Khromov (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Fiziologiia Cheloveka*, vol 8, May-June 1982, p 407-415 48 refs In Russian

Tests were performed on 210 inhabitants of the Magadan region of the USSR in order to study the bioenergetics of erythrocytes under Arctic conditions It is shown that the erythrocytes of the peripheral circulation of Arctic inhabitants have lower levels of ATF, common and reduced glutathione, and catalase and glutathione peroxidase activity than those of inhabitants of temperate regions The lipids of erthrocyte membranes of Arctic inhabitants are characterized by an increased quantity of unsaturated fatty acids and a considerable increase in the rate of nonenzymatic peroxidation Here the erythrocyte morphology is characterized by an increased cell size, a marked polymorphism, and increased echinocyte population These results are discussed in the light of possible reasons for the premature aging of erythrocytes B J

A82-35832 † The hemostasis system in man in high-altitude conditions (Sistema gemostaza u cheloveka v usloviiakh vysokogor'ia) V A Isabaeva and T A Ponomareva (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor ia, Frunze, Kirgiz SSR) *Fiziologiia Cheloveka*, vol 8, May-June 1982, p 416-430 68 refs In Russian

The literature of functional changes of the human hemostasis system in high-altitude conditions is reviewed A detailed analysis is presented of variations of blood coagulation in cases of individual adaptation to various high-altitude regions (Tien Shan, Pamir, the Caucasus, and the Himalayas) It is shown that the adaptive reaction of hemostasis is a phase process of hyper/hypocoagulational character A systematic review is presented of data on the role of separate components of the hemostasis system (procoagulants, anticoagulants, thrombocytes, and fibrinolysis), and their interrelationships in the case of chronic high-altitude hypoxia The role of hemostasis as an important homeostatic system in adaptation to high-altitude conditions is emphasized B J

A82-35833 † Psychophysiological analysis of periodic oscillations of performance quality within the limits of a work cycle (Psikhofiziologicheskii analiz periodicheskikh kolebanii kachestva deiatel'nosti v predelakh trudovogo tsikla) G M Zarakovskii, A M Karpukhina, and V A Salamatov (Ministerstvo Prosveshchenila Ukrainskoi SSR, Nauchno-Issledovatel'skii Institut Psikhologii, Kiev, Ukrainian SSR) *Fiziologiia Cheloveka*, vol 8, May-June 1982, p 431-444 31 refs In Russian

The paper examines the theoretical principles underlying experimental results on periodic oscillations of various quality indices of work performance and the level of the nonspecific activation of the central nervous system It is suggested that oscillatory processes within the limits of a work cycle have a compensatory-adaptive character, providing for the maintenance of the necessary working level of the functioning of various physiological and psychic systems by the alternation of the degree of their activation A practical result of the present study may be an increase in the reliability of the monitoring of the vigilance level of human operators B J

A82-35834 † Omega potential: Quantitative index of states of brain and organism structures I - The physiological significance of the omega potential when it is recorded from deep structures and from the scalp (Omega-potentsial: Kolichestvennyi pokazatel' sostoianii struktur mozga i organizma. I - O fiziologicheskoi znachimosti omega-potentsiala pri registratsii ego s glubokikh struktur i s poverkhnosti kozhi golovy). V A Iliukhina (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) *Fiziologiia Cheloveka*, vol 8, May-June 1982, p 450-456 20 refs In Russian

A82-35835 † Fatigue and the adaptive possibilities of the organism during work (Utomlenie i adaptatsionnye vozmozhnosti organizma v protsesse truda) B N Petukhov, N S Udarova, O A Likhacheva, and L P Stepanova (Goskomtrud SSSR, Nauchno-Issledovatel'skii Institut Truda, Moscow, USSR) *Fiziologiia Cheloveka*, vol 8, May-June 1982, p 457-462 13 refs In Russian

Experimental results are presented concerning the adaptation of the human body to various elements of a work environment Physiological and psychological studies relating to work-related fatigue were made on beginning workers and experienced workers It is found that the incidence of fatigue among the former is more marked than among the latter Particular attention is given to those types of work wherein only moderate fatigue arises, and workers become physiologically and psychologically adapted to the conditions of their work, developing a general nonspecific resistance B J

A82-35836 † Evaluation of the functional state existing in the adaptation to high-altitude conditions (Otsenka funktsional'nogo sostoianiia pri adaptatsii k usloviiam vysokogor'ia) A D Aidaraliev, V M Iakovlev, and D M Imanaliev (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor ia, Frunze, Kirgiz SSR) *Fiziologiia Cheloveka*, vol 8, May-June 1982, p 463-468 16 refs In Russian

Tests were conducted on marathon runners during 1979-1980 as they were training on flat land and in medium- and high-altitude conditions (1700 and 2800 meters above sea level) in order to study their adaptation to high-altitude conditions The adaptive responses were analyzed on the basis of Baevskii's index, characterizing strain placed on the bioregulation systems, the Arinchin-Sytin indices concerning the degree of stress on the heart and blood vessels, and the Mirrakhimov-Aidaraliev index concerning the quality of the adaptive response in high-altitude conditions It is shown that these indices complement the general-physiological criteria for human adaptability to extreme physical stress in high-altitude conditions and make it possible to obtain information necessary for the compensation of individual loads B J

A82-35837 † Strain on the regulation systems as a condition of successful adaptation to heat (Napriazhenie sistem reguliatsii kak uslovie uspeshnoi teplovoi adaptatsii) A T Mar ianovich (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) *Fiziologiia Cheloveka*, vol 8, May-June 1982, p 477-480 11 refs In Russian

Experimental results are presented on the acclimatization of 14 healthy persons to a hot, dry environment It is shown that the necessary conditions of successful adaptation to heat under discontinuous heat stress is a relationship between the time of exposure to the hot environment and periods between exposures that provides for a marked disruption of thermal homeostasis towards the end of the last exposure It is also shown that the total duration of the series of discontinuous exposures, leading to a heightened tolerance to heat, is roughly equal to the time of adaptation in the case of continuous daily exposures lasting several hours B J

A82-35838 † Seasonal variations of human cardiorespiratory indices in the North (Sezonnye izmeneniia kardiorespiratornykh pokazatelei u cheloveka na Severe). V G Evdokimov and A T Ketkin (Akademiia Nauk SSSR, Institut Biologii, Syktyvkar, USSR) *Fiziologiia Cheloveka*, vol 8, May-June 1982, p 481-488 36 refs In Russian

A82-35839 † Dependence of reactions of the organism to extremal factors on initial state (Zavisimost' reaktsii organizma na ekstremal'nye

faktory ot iskhodnogo sostoianiia) V P Zagriadskii and Z K Sulimo-Samuillo (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR) *Fiziologiia Cheloveka*, vol 8, May-June 1982, p 496-498 In Russian

Reactions to physical stress, hypoxemia, and high environment-temperature were tested on two groups of subjects with different levels of initial indices of external respiration and of the cardiovascular system It is shown that the initial value of the above indices in a state of relative rest determines the character of subsequent reactions Thus, persons with initial indices at the upper limit of the physiological norm showed less marked reactions to the extremal factors and a longer period for their recovery than subjects whose indices were below this limit It is suggested that the initial values of certain indices can be used to predict the reaction of the organism to various extremal factors B J

A82-35840 † **Rate of change of physiological functions as an index of the degree of adaptation (Skorost' izmeneniia fiziologicheskikh funktsii kak pokazatel' vyrazhennosti adaptatsii).** N V Zgoda (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) *Fiziologiia Cheloveka*, vol 8, May-June 1982, p 504-506 In Russian

The possibility of using the rate of change of physiological functions as an index of the degree of human adaptation to some extremal condition is examined It is shown that the rate of change of physiological parameters varies in a regular manner in the adaptation of hypoxia (which is used here as an example of an extremal factor) in the transition period as well as in the stabilization regime It is therefore concluded that the rate of change of physiological functions can serve as an index of the degree of adaptation B J

A82-35901 Head-temperature effects on physiology, comfort, and performance during hyperthermia. S A Nunneley, D C Reader, and R J Maldonado (USAF, School of Aerospace Medicine, Brooks AFB, TX) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 623-628 23 refs

The effects of head temperature on comfort, cognitive performance and reaction time, and body temperature are evaluated under hyperthermic conditions in subjects whose head and body temperatures were controlled separately by the use of liquid-conditioned garments Subject performance on a manikin task, and skin, esophogeal and rectal temperatures were measured during two heating and cooling cycles incorporating all four possible combinations of head and body heating and cooling The temperature of the cap covering the subject's head, which varied from 8 to 43 C, is found not to affect rectal temperature, however significantly altered the rate of change of the esophageal temperature Head temperature is also observed to be a major determinant of subjective comfort as the temperature of the garment covering the body varied between 30 and 43 deg Body heating tended to shorten reaction time and decrease accuracy, while head cooling reversed these trends It is concluded that head cooling deserves serious consideration as a means for optimizing operator performance in hot environments A L W

A82-35902 Effect of dietary fat on pulmonary enzymes and toxicity during normobaric hyperoxia C L Schatte and M M Mathias (Colorado State University, Fort Collins, CO) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 629-632 25 refs Contract No N00014-76-C-0437

Weanling male rats were fed a semipurified diet containing 10, 20, 40 or 60% of calories as fat having a constant polyunsaturated/saturated fatty acid ratio of 0 7 After 21-28 days of feeding, animals from each treatment group were exposed to pure oxygen at one atmosphere absolute for up to 72 h Some animals were sacrificed after 0 or 48 h of oxygen exposure and lung tissue analyzed for the activities of the hexose monophosphate shunt and prostaglandin dehydrogenase/reductase Other animals were exposed to hyperoxia until death With increasing dietary fat content, the pre-exposure activities of the two enzymes decreased and oxygen-induced mortality increased There was no dietary effect on enzyme activities after 48 h of hyperoxia It was concluded that both dietary fat content and the pre-exposure activity of prostaglandin dehydrogenase/reductase influenced the relative susceptibility to pulmonary oxygen poisoning (Author)

A82-35903 Radiogenic changes in the behavior and physiology of the spontaneously hypertensive rat - Evidence for a dissociation between acute hypotension and incapacitation. G A Mickley, H Teitelbaum, G A Parker, F Vieras, B A Dennison, and C H Bonney (U S Armed Forces Radiobiology Research Institute, Bethesda, MD) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 633-638 31 refs

The Armed Forces Radiobiology Research Institute's linear accelerator was used to expose rats to high-energy electron radiation The purpose of the study was to investigate both radiogenic blood pressure and performance changes in a strain of rat bred for hypertension (spontaneously hypertensive rat SHR) in order to determine if high blood pressure might attenuate early transient incapacitation (ETI) Although male SHRs experienced a severe drop in blood pressure, much of the data is inconsistent with the hypothesis that hypotension causes performance decrements In an additional series of studies, blood volume and serum chemistry data were examined Male SHRs were significantly higher than normotensive controls on several blood chemistry determinations Exposure to ionizing radiation tended to enhance these differences These results could not be explained on the basis of radiogenic blood volume fluctuations B J

A82-35904 * **Measurement of cardiopulmonary performance during acute exposure to a 2440-m equivalent atmosphere.** B M Levitan (NASA, Johnson Space Center, Physiological Performance Laboratory, Technology, Inc , Houston, TX) and M W Bungo (NASA, Johnson Space Center, Physiological Performance Laboratory, Houston, TX) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 639-642 17 refs Contract No NAS9-14880

Each of 20 subjects (ranging in age from 18 to 38 years, 15 being male, five female) was given two Bruce Protocol symptom-limited maximum treadmill stress tests, breathing sea-level compressed air (20 9% O2) for one test and a 2440-m equivalent (15 5% O2) for the other A significant difference was found to exist between measured VO2 max (p less than 0 0002) and exercise time (p less than 0 0004) for the two conditions No significant differences were observed in heart rate or the recovery time to a respiratory quotient of less than 1 Hemoglobin saturation, as measured by an ear oximeter, averaged 95% for sea-level and 91% for the 2440-m equivalent gases These results support a 2440-m equivalent contingency atmosphere in the Space Shuttle prior to donning a low-pressure suit for the purpose reducing nitrogen washout times B J

A82-35905 * **Investigation of the combined effects of bedrest and mild hypoxia** J M Waligora, D J Horrigan, Jr , Michael W Bungo, and J Conkin (NASA, Johnson Space Center, Environmental Physiology Laboratory, Houston, TX) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 643-646 11 refs

Subjects were exposed to an 8-h mild hypoxia exposure (8000 ft equivalent, 2438 m) with and without a 28-h period of 6 deg headdown bedrest Anticipated responses to the bedrest and the hypoxia were observed There was no indication that bedrest affected the arterial oxygenation or the oxygen gradient across the lungs of the subjects undergoing mild hypoxia It is concluded that there is no evidence that would preclude an alveolar O2 pressure as low as 69 torr during contingency spacecraft operation (Author)

A82-35906 Postural stability during slow-onset and rapid-onset hypoxia D E Holness, W D Fraser, D E Eastman, J A G Porlier, and M A Paul (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 647-651 21 refs

The standing steadiness and postural tremor of seven male volunteers were examined during slow and rapid induction of hypoxia Spectrum analysis of position coordinates and tremor data generated from a quartz multicomponent force measuring platform and a tremor transducer showed that postural tremor and anteroposterior sway increased significantly during hypoxia Rate of onset of hypoxia, however, did not affect the development of the increased tremor, whereas rapid-onset hypoxia consistently induced a greater anteroposterior sway than slow-onset hypoxia Lateral sway was not affected by either slow- or rapid-onset hypoxia, however, it was significantly greater when eyes were closed compared to when they were opened Anteroposterior sway was also significantly greater when visual cues were eliminated during both slow- and rapid-onset hypoxia Heart rate and cardiac index of subjects increased significantly during both conditions of hypoxia (Author)

A82-35907 * **Effect of orthostatic stress on exercise performance after bedrest.** V A Convertino, D J Goldwater, and H Sandler (NASA, Ames Research Center, Biomedical Research Div , Moffett Field, CA) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 652-657 34 refs

The cardiorespiratory responses to supine against upright exercise were compared to determine the orthostatic effects of gravity on exercise performance following bedrest Five healthy male subjects underwent seven days of continuous bedrest A deconditioning effect was manifested by significant increases in ventilation volume, carbon dioxide production, respiratory exchange ratio, heart rate, heart rate-pressure product, and diastolic blood pressure during submaximal exercise following bedrest The major finding from this study was that bedrest resulted in a general decrease in exercise tolerance, which was more stressful in the upright posture compared to the supine position, judging from specific submaximal cardiorespiratory responses to cycle ergometry The data support the hypothesis that there is an orthostatic factor to the reduction in work tolerance following bedrest deconditioning, in addition to the effects caused by increased physical activity B J

A82-35908 Pulmonary oxygen toxicity - Possible role of ammonia in desorbing lung surfactant. B A Hills (Texas, University, Houston, TX) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 658-662 27 refs

A porous membrane has been synthesized from a fine-weave cotton fabric carboxylated to simulate the fixed negative charges in the alveolar wall When this membrane is treated with pulmonary surfactant in physiological concentrations, especially dipalmitoyl lecithin, it loses its fluid permeability and can support a pressure of physiological saline of over 272 torr without bursting through When the saline is replaced by isotonic ammonium chloride solution, the average pene-

tration pressure is reduced to 187 torr These data are examined in regard to the known production of ammonia upon hyperbaric exposure and the competition of the resulting positive ammonium ions for the negative sites on the alveolar wall previously occupied by the positive quaternary ammonium ions of the effectively cationic lung surfactant Successful replacement must then promote edema formation *This is proposed as a possible mechanism for the indirect (blood-borne)* effect of oxygen upon the lung Thus, it is suggested that the indirect route for pulmonary oxygen toxicity could be mediated through the ammonia produced in significant quantities in many organs when the body is exposed to excessive oxygen and that one possible mechanism is competitive desorption of surfactant at the alveolar wall B J

A82-35909 Regional blood flow in the domestic fowl immediately following chronic acceleration. W J Weidner, L F Hoffman, and S D Clark (California, University, Davis, CA) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 666-669 18 refs Research supported by the American Heart Association

Chickens were centrifuged at +2Gz for 30-61 d in order to examine the effects of chronic low-G acceleration on blood flow distribution and cardiac output The chickens were anesthetized after removal from the centrifuge and surgically prepared in order to measure cardiac output and regional blood flows by the reference sample method with Sr-85 labeled microspheres Regional blood flows to the kidney, eyes, and skeletal muscle were significantly increased in animals subjected to chronic +2Gz as compared with noncentrifuged control animals While the mechanism by which these increases in blood flow occurred is not known, results indicate that chronic exposure to hyperdynamic gravitational fields can alter circulatory dynamics It is concluded that the cardiovascular system is directly involved in the process of adaptation to chronic positive acceleration B J

A82-35910 The landing signal officer - Auditory aspects. R M Robertson, D W Maxwell, and C E Williams (U S Naval Aerospace Medical Center, Naval Aerospace Medical Research Laboratory, Pensacola, FL) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 670-675 Navy-supported research

Landing signal officers (LSOs), exposed to high noise levels during carrier operations, do not routinely wear hearing protectors Noise exposure data obtained during carrier qualifications on the USS Lexington and the USS Forrestal suggested a clear risk for hearing damage Moreover, a comparison of the hearing of LSO and non-LSO pilots matched for age and number of flight hours, indicated a trend for LSOs to have poorer hearing Questionnaire data from 225 LSOs indicate they need full access to aircraft auditory cues, which is not attainable with current off-the-shelf hearing protectors It is recommended that a hearing protector be developed for the LSO which would permit passage of critical auditory cues and, at the same time, provide hearing protection There should be a redesign or elimination of the UHF handset If eliminated, a boom-type noise-cancelling microphone in conjunction with earphones integral to the hearing protector should be considered Additional hearing studies of LSO and non-LSO pilots should be undertaken (Author)

A82-35911 A procedure for the analysis of nystagmus and other eye movements. G R Barnes (RAF, Institute of Aviation Medicine, Farnborough, Hants , England) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 676-682 15 refs

A simple procedure has been developed for the computer analysis of nystagmus and other eye movements using the superior pattern recognition capabilities of the human operator to distinguish between fast- and slow-phase eye movements The basis of the procedure is that the operator can set up threshold limits around an expected slow-phase eye velocity waveform through the use of cursor facilities Points lying outside the threshold limits are recognised as fast-phase eye movements and discarded Various least-squares curve-fitting procedures are then used to establish the relationship between the occulomotor response and the stimulus waveform Examples are given of analysis procedures for both periodic and transient responses of the vestibulo-ocular reflex The method is particularly useful for the analysis of responses to voluntary head movement in which slow-phase velocity frequently approaches that of the fast-phase components (Author)

A82-35912 Change in plasma cAMP and catecholamines in men subjected to the same relative amount of physical work stress. P C Painter, E T Howley, and J N Liles (Tennessee, University, Memorial Hospital, Knoxville, TN) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 683-686 19 refs

This study has shown, for the first time, that the change in plasma adenosine 3',5 -cyclic monophosphate (cAMP), from accommodation or trough levels, correlates highly in both progressive and continuous work stress experiments with epinephrine at 0 990 and 0 898, and norepinephrine at 0 954 and 0 927, respectively, in men subjected to the same relative, rather than absolute, stress levels All three analytes increased significantly by the time each subject had reached 80% of his maximal oxygen uptake in the progressive experiments and after working at 80% of his maximal oxygen uptake continuously for 10 min In no case did plasma cAMP rise before the catecholamines The possible significance of these observations to net perceived relative physiological stress is discussed (Author)

A82-35914 Inflight medical facilities. G R W Davies and P R Degotardi *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 694-700 34 refs

The need and facilities currently provided for emergency medical care aboard airliners are reviewed, with particular emphasis on the Australian situation Available evidence suggests that there is no requirement for revising the first-aid equipment and practices of Australian domestic airlines For long-haul services, *there does appear to be a justification for a higher level of medical facility* because of the duration of separation and at least a hypothetical increase in risk due to factors such as mild hypoxia, immobility, and dehydration However, the contents of the present Quantas physicians' kit has proved adequate to cover most contingencies and any extra effort toward improvement of inflight emergency *care should first be directed toward an improved working area* B J

A82-35915 Health advice for aircrew on refugee flights. J S Keystone and L McIntyre (Toronto General Hospital, Toronto, Canada) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 701-703 16 refs

Airlines involved in transporting Indochinese refugees from Southeast Asia were surveyed in order to assess measures to protect the health of crews on refugee flights Five of the 20 airlines surveyed provided sufficient data for analysis, combined, the five airlines transported approximately 2500 refugees on more than 100 flights, involving at least one crew change per flight It is found that the aircrew on the flights surveyed were improperly advised regarding immunizations and were overly protected against enteric infections where hand washing to prevent the transmission of disease would have been sufficient Malaria *chemoprophylaxis was inappropriate for some aircrew who were not exposed to* malaria and unsuitable for personnel venturing into drug-resistant malarious areas Disinfection of aircraft upon leaving Southeast Asia was not performed by most of the airlines surveyed, resulting in a potential public-health risk Recommendations are made for future refugee flights B J

A82-35916 Familial intermittent diplopia - A report of two cases. S F Flynn, K W Welsh, and J R Dille (FAA, Civil Aeromedical Institute, Oklahoma City, OK) *Aviation, Space, and Environmental Medicine*, vol 53, July 1982, p 704-707 16 refs

The presence of sufficient muscle balance and bifovial fixation to prevent a break in fusion resulting in diplopia, even under conditions of hypoxia, fatigue, stress, and peripheral gaze, has been of concern in aviation medicine since 1917 Few breaks in fusion in flight have ever been reported, and most known cases of diplopia are from the history, not from test results This paper describes a recent examination of a 54-year old subject (a civil-aviation employee, but not a pilot) with a five-year history of several daily episodes of incapacitating diplopia, in addition, there is information about his 48-year-old brother who has a similar history When asymptomatic, both have normal vision test results It is emphasized that detection was from the histories, the diagnosis remains uncertain It is concluded that the ease of concealment, rare test value, and prevalent examiner skills are of concern, the importance of the history is reaffirmed B J

A82-36011 † Contents of protein and amino acids in methanobacterial biomass (Soderzhanie belka i aminokislost v biomasse metanotrofnykh bakterii). V F Gal'chenko, A I Nesterov, and M V Ivanov (Akademiia Nauk SSSR, *Institut Biokhimii i Fiziologii Mikroorganizmov, Pushchino*, USSR) *Akademiia Nauk SSSR, Doklady*, vol 264, no 2, 1982, p 494-496 13 refs In Russian

A82-36026 Man at extreme altitude J B West (California, University, La Jolla, CA) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1393-1399 22 refs Grants No NIH-N01-HR-62915, No NIH-R01-HL-24335

The advance of knowledge of the effects of high altitudes on human life are traced through incidents and tests performed during hot-air balloon ascents and mountain climbing Early balloon flights to heights exceeding 8000 m caused some fatalities, and 19th century discoveries included the importance of oxygen in low barometric environments Blood samples were taken in mountain climbing *expeditions in the 1920s, showing an alveolar CO2 partial pressure of 8 torr at* 7010 m, which was later found to be half the actual value The summit of Mt Everest was reached for the first time by climbers without oxygen supplies in 1978 A different expedition up the slopes of Mt Everest in 1973 resulted in the discovery that subjects who are acclimatized to heights do not return to sea level oxygen intake when supplementary oxygen is available M S K

A82-36027 Mechanical properties of the lungs during acclimatization to altitude H Gautier, R Peslin, A Grassino, J Milic-Emili, B Hannhart, E

Powell, G Miserocchi, M Bonora, and J T Fischer (Paris VI, Université, Paris, Nancy I, Universite, Vandoeuvre-les-Nancy, Meurthe-et-Moselle, France, Meakins-Christie Laboratories, Montreal, Canada, Milano, Universita, Milan, Italy) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1407-1415 36 refs Research supported by the Institut National de la Sante et de la Recherche Medicale

Lung volumes and mechanics were examined in nine subjects at sea level and then on each day for six days at 3457 m altitude Volume was recorded using a flow type plethysmograph, which was found to be insensitive to gas density variations Chest spirograms were made, thoracic gas volume was measured, air way resistance was gaged with a pneumotachograph, and forced expiratory and inspiratory maneuvers were performed on or by each subject Esophogeal pressure was also examined with a latex balloon-catheter system introduced through the nose for inflation in the stomach A significant loss of the lung static recoil pressure was observed over the lung volume range of 60-90 percent, while the mean inspiratory flow increased from days 1-4 at altitude The dynamic lung compliance was unaffected by altitude Pulmonary flow resistance, however, decreased continuously to a value of 25 percent of day 1 on day 6 Further studies to detect if the time course of neural drive is altered at high altitudes are indicated M S K

A82-36028 Splanchnic vasoconstriction in heat-stressed men - Role of renin-angiotensin system. P Escourrou, P R Freund, L B Rowell, and D G Johnson (Washington, University, Seattle, WA, Arizona, University, Tucson, AZ) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1438-1443 33 refs Research supported by the Ministere des Affaires Etrongères, Grants No NIH-HL-16910, No NIH-AM-25318, No NIH-RR-37, No NIH-GM-01160

A82-36029 Effects of endogenous glucagon on glucose kinetics in shivering dogs Y Minaire, J Forichon, and A Freminet (Lyon I, Universite, CNRS, Lyons, France) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1458-1463 43 refs

Seven female dogs were equipped with catheters for blood sampling, insulin injection, and somatostatin infusion, then sheared and tested in 25 and -21 C conditions Doses of either the somatostatin, insulin, or normal saline with glucose were fed intravenously to the shivering dogs Measurements included packed cell volumes, plasma glucose concentration, immunoreactive insulin and glucagon levels, and hepatic glycogen content Plasma glucagon levels remained relatively constant in both temperature ranges, while glucose production doubled in the shivering canines, implying that glucagon is not the stimulus for increased glucose production M S K

A82-36030 An automated, indirect assessment of cardiac output during rest and exercise. J H Wilmore, P A Farrell, A C Norton, R W Cote, III, E F Coyle, G A Ewy, L P Temkin, and J E Billing (Arizona, University, Tucson, AZ) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1493-1497 28 refs

A partial automation of the measurement of cardiac output through modification of the equilibration CO2 rebreathing technique was accomplished by using the Beckmann Metabolic Measurement Cart (MMC) The three variables, CO2 production, end-tidal CO2 pressure, and CO2 pressure in a rebreathing bag during the equilibration stage of the rebreathing procedure, were measured in breath-by-breath gas sampling in a sequence which repeated every 30 sec Operator judgment was involved in deciding when the subject was in the same steady-state when each of the three variables was sampled Six healthy subjects were examined to validate the procedure in comparisons of rest and cycle ergometer trials, and additional tests were run on eleven subjects with coronary artery disease using a thermodilution procedure with arterial catheterization The thermodilution method was found to yield values 16 6 percent higher than the CO2 rebreathing technique It is concluded that the method is viable for detecting suspected coronary disease when measurements are made in the supine position M S K

A82-36031 *Parameters of ventilatory and gas exchange dynamics during exercise.* B J Whipp, S A Ward, N Lamarra, J A Davis, and K Wasserman (California, University, Medical Center, Torrance, CA) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1506-1513 45 refs Grant No NIH-HL-11907

The pulmonary gas-exchange and ventilatory response patterns during steady-state muscular exercise were examined in six subjects during cycle ergometer trials to establish characteristic exponential functions Expiratory air was analyzed on a pneumatograph while O2 and CO2 partial pressures were assessed by mass spectrometry The subjects performed six minutes of work and six minutes of rest in alternation after individual maximal workloads were determined An early phase of response in terms of ventilation, O2 uptake, and CO2 output were detected which were different from patterns during steady-state conditions The initial phase of rest to work exhibited higher cardiac output and pulmonary flow than the transition to steady state A model was developed which fit the data once the steady-state plateau was reached M S K

A82-36032 Bohr effect and slope of the oxygen dissociation curve after physical training K M Braumann, D Boning, and F Trost (Hannover, Medizinische Hochschule, Hanover, West Germany) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1524-1529 30 refs

The influence of intensive training over a period of 6 mos on the hemoglobin-oxygen (Hb-O2) affinity in athletes was examined in terms of factors which alter the O2 dissociation curve Eight athletes were tested during the off-season and the season, with Hb samples determined photometrically, and levels of 2,3 diphosphoglycerate, adenosine triphosphate (ATP), lactic acid, and the hematocrit value also assayed Before and after comparisons for different levels of conditioning were examined statistically with the Student's test for paired samples An increased Bohr coefficient was detected after physical training No alteration of the Hb molecule was observed, while dissociation curves of young erythrocytes have a steeper slope than those of older red cells An increase of Hb-O2 affinity was concluded to occur, implying greater O2 extraction from the blood in physically trained subjects M S K

A82-36033 * Effects of horizontal body casting on the baroreceptor reflex control of heart rate. G E Billman, D T Dickey, H Sandler, and H L Stone (Oklahoma, University, Oklahoma City, OK) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1552-1556 24 refs Grant No NsG-2282

The purpose of this study was to investigate the effects of long-term horizontal body position on baroreceptor reflex control of heart rate Six male rhesus monkeys (6 2-9 4 kg) were given bolus injections of 4 0 microgram/kg, phenylephrine during each of the following conditions awake, anesthetized (10 mg/kg ketamine HCl), and after beta-blockade (1 mg/kg propranolol HCl) before, 7, 14, and 28 days after being placed in a horizontal body cast R-R interval vs systolic arterial pressure was plotted, and the slope was determined by least-squares-fit linear regression Baroreceptor slope was significantly reduced by 7 days of horizontal body position and remained attenuated throughout the 28-day restraint period both before and after beta-receptor blockade These data are consistent with the thesis that prolonged exposure to a zero-gravity environment impairs autonomic reflex regulation of the cardiovascular system (Author)

A82-36034 Superficial shell insulation in resting and exercising men in cold water A Veicsteinas, G Ferretti, and D W Rennie (New York, State University, Buffalo, NY, Milano, Universita, Milan, Italy) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1557-1564 37 refs Grant No NIH-P01-HL-14414

The results of studies of the insulation value of skin and subcutaneous fat layers in men at rest and during mild exercise while immersed in cold water are reported, together with data for whole-body insulation Nine sedentary medical students of varying levels of measured subcutaneous fat experienced 3 hr in cool water while carrying a thermistor inserted beneath the skin and into the rectum Heat flow was recorded, while the overall body insulation was calculated numerically by indirect calorimetry Further trials examined the effects of exercise while immersed Increasing fat thickness was found to provide higher overall body insulation, while exercise in cold water decreased the insular value of subcutaneous skin tissue The unperfused skin and subcutaneous fat were concluded to furnish 10-15 percent of the whole-body insulation during immersion at rest, and up to 40 percent during exercise M S K

A82-36035 Evidence for diminished sensitivity of the hamster pulmonary vasculature to hypoxia. B R Walker, N F Voelkel, I F McMurtry, and E M Adams (Colorado, University, Denver, CO) *Journal of Applied Physiology - Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1571-1574 26 refs Grant No NIH-HL-14985

A82-36036 Intrapulmonary blood flow redistribution during hypoxia increases gas exchange surface area R L Capen (Colorado, University, Denver, CO) and W W Wagner, Jr (Colorado College, Colorado Springs, CO) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1575-1580 23 refs Research supported by the Carnegie-Mellon Foundation, Grants No NIH-HL-14985, No NIH-HL-07171

It was previously shown that airway hypoxia causes pulmonary capillary recruitment and raises diffusing capacity for carbon monoxide This study was designed to determine whether these events were caused by an increase in pulmonary vascular resistance, which redistributed blood flow toward the top of the lung, or by an increase in cardiac output Capillary recruitment at the top of the dog lung was measured by in vivo microscopy, gas exchange surface area of the whole lung by diffusing capacity for carbon monoxide, and blood flow distribution by radioactive microspheres During airway hypoxia recruitment occurred, diffusing capacity increased, and blood flow was redistributed upward When a vasodilator was infused while holding hypoxia constant, these effects were reversed, i e , capillary 'derecruitment' occurred, diffusing capacity decreased, and blood flow was redistributed back toward the bottom of the lung The vasodilator was infused at a rate that left hypoxic cardiac output unchanged

These data show that widespread capillary recruitment during hypoxia is caused by increased vascular resistance and the resulting upward blood flow redistribution (Author)

A82-36037 Exercise performance after ventilatory work B Martin, M Heintzelman, and H -I Chen (Indiana University, Bloomington, IN) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1581-1585 30 refs Grant No NIH-HL-26351

The strength reserve of ventilatory muscles was tested by having subjects perform hyperpnea before spirometric tests on a treadmill Instrumentation included channeling the subjects' breath through a chamber which allowed measurement of O2 uptake and CO2 levels in expirated air Hyperpnea was maintained for 150 min, followed by running to exhaustion on a treadmill Control trials were run before introduction of the pre-exercise hyperpnea to establish exhaustion levels on the treadmill The exhaustion state was subsequently reached in a shorter time period once the deep breathing preceded the treadmill tests, occurring at lower levels of heart rate, ventilation, and O2 uptake than without the deep breathing It is suggested that glycogen depletion occurs in the ventilatory muscles, a behavior similar to that of the skeletal muscles in exhaustive exercise conditions M S K

A82-36038 Effects of glycogen depletion and pedaling speed on 'anaerobic threshold'. E F Hughes, S C Turner, and G A Brooks (California, University, Berkeley, CA) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1598-1607 34 refs Grant No NIH-AM-19577

Efforts to determine whether the divergence between lactate and ventilatory inflection points are due to different gradients of pedaling speed and glycogen depletion in the muscles are reported Nine subjects performed incremental work rate tests on a bicycle ergometer until maximal work rates were reached Additional trials were run involving periodic pedaling at 50 rpm at levels just below the lactate inflection point Inspired air volumes were measured on a potentiometer and blood samples were taken before the tests and within 2 minutes of the start of any load cycle The decoupling of the ventilatory and lactate level inflection points occurred without any correlation to alterations in the pedaling frequency or body glycogen levels An increase in ventilation was observed in the glycogen depletion tests, and correlations between the blood lactate and plasma bicarbonate indicate that lactate was the primary cause of exercise-induced acidosis M S K

A82-36039 Attenuation of blood pressure increases in Dahl salt-sensitive rats by exercise. R E Shepherd, M L Kuehne, K A Kenno, J L Durstine, T W Balon, and J P Rapp (Toledo, University, Ohio, Medical College, Toledo, OH) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1608-1613 33 refs Research supported by the University of Toledo and American Heart Association, Grants No NIH-AM-21912, No NIH-HL-20176

Female Dahl S and R rats were exposed to running training and salt augmentation in diet to determine the effect that chronically practiced physical activity has on blood pressure The rats were divided into groups which either ran 27 m/min, 60 min/day, 5 days/week, for 8 wk on a treadmill, or did not run, or were trained for 12-24 wks, or began training 6 wks after the controlled diet was introduced and trained for 6 wks Measurements were made of blood pressure by use of the microphonic tail-cuff method S rats which ran exhibited lower blood pressures than all other groups of rats, while R rats displayed no differences in either sedentary or active groups Hypertension was also lowered in the active S rats compared to the sedentary rats after salt was introduced to the diet, although rats with salt in the diet before exercise training never fully compensated for the addition of salt and concomitant onset of hypertension M S K

A82-36040 Effect of habitual exercise on left ventricular response to exercise. J D Anholm, C Foster, J Carpenter, M L Pollock, C K Hellman, and D H Schmidt (Wisconsin, University, Mount Sinai Medical Center, Milwaukee, WI) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1648-1651 30 refs

Forty-five males in three levels of physical training were examined at rest and after maximal exercise by means of radionuclide angiography to assess the effect of regular exercise on left ventricular function The subjects included groups which trained more than 7 hr/wk, 2-4 hr/wk, and less than 1 hr/wk in aerobic activity The tests were performed to exhaustion on a bicycle ergometer while data was gathered by electrocardiogram and blood pressure measurements Radionuclide angiograms were made at rest and after the trials A high correlation was found between the left ventricle ejection rate (LVER) and work capacity Resting values of left ventricular function were found to not depend on conditioning, while significant differences were observed for both LVER and ejection fraction An expansion in the left ventricular dimensions was indicated in the well-trained group M S K

A82-36041 Sympathetic and parasympathetic cardiac control in athletes and nonathletes at rest. P G Katona, M McLean, D H Dighton, and A Guz (Charing Cross Hospital Medical School, London, England, Case Western Reserve University, Cleveland, OH) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology*, vol 52, June 1982, p 1652-1657 32 refs Grant No NIH-HL-20328

The relative roles of intrinsic heart rate and neural factors which cause observed bradycardia in physically conditioned humans were examined in comparison with a control group of nonathletes The relative shifts or increase of control activity by the parasympathetic and sympathetic nervous systems as a result of beta blocker introduction are discussed in terms of a numerical model weighted by contributions from the two neural systems The subjects were injected with either propranolol or atropine sulfate to block the effects of one of the two systems to a degree which could be detected Monitoring was carried out for heart rate, blood pressure, and respiration No significant differences were detected in heart rate changes between the athletes and nonathletes Evidence for a specific agent which causes reduced resting heart rates in athletes is discussed M S K

A82-36172 † The effect of acute hypoxia on the EEG and unit impulse activity of neurons of different brain structures in rats (Vliianie ostroi gipoksii na EEG i impul'snuiu aktivnost' neironov razlichnykh struktur mozga u krys) N S Akopian, O G Baklavadzhian, and M A Karapetian (Erevanskii Gosudarstvennyi Universitet, Yerevan, Armenian SSR) *Fiziologicheskii Zhurnal SSSR*, vol 68, May 1982, p 576-582 22 refs In Russian

The dynamics of the effect of acute hypoxia on the EEG and unit impulse activity of different brain structures in rats was experimentally investigated The initial phase of hypoxia (2000-6000 m) involved the activation of the EEG and unit pulse activity, the EEG activity arising earlier and being more marked In the second phase of hypoxia (7500-10,000 m), the EEG changed towards a predominant slow rhythm of delta type, while the unit impulse activity gradually diminished, the cortical neurons displaying a higher sensitivity to hypoxia and an earlier suppression than the cells of the hypothalamus and medulla In all phases, the EEG waves showed a greater sensitivity to the rapid peripheral signals than the unit impulse activity of the cortex and other brain structures B J

A82-36229 Cell-mediated immune reactions in ground squirrels in winter lethargy - Two-way transplantation reaction. T M Shivacheva (B'lgarska Akademiia na Naukite, Institut po Morpologiia, Sofia, Bulgaria) *Bolgarskaia Akademiia Nauk, Doklady*, vol 35, no 2, 1982, p 245-248 12 refs

The immunocompetency of the lymphoid cells of hibernating ground squirrels is investigated in experiments involving both graft-versus-host and host-versus-graft reactions Immune reactions were evaluated according to the popliteal lymph node assay in nonhibernating ground squirrels injected with spleen cells from hibernating and nonhibernating ground squirrels and in hibernating animals injected with spleen cells from nonhibernating animals at various times of the year The local transplantation reaction in nonhibernating squirrels immunized with cells from nonhibernating squirrels is observed to exhibit seasonal variations in intensity, while that for nonhiberating squirrels immunized with cells from hibernating animals is constant throughout the winter months at an intensity corresponding to the lowest intensity observed for nonhibernating squirrel spleen cells Ground squirrels in deep hibernation did not develop the immune reaction Results may be linked with the seasonal involution and involutive changes in the thymus, lymph nodes and spleen of ground squirrels A L W

A82-36260 † Superconducting magnetocardiograph (Sverkhprovodiashchii magnitokardiograf) V Fodel' *Priroda*, June 1982, p 107, 108 In Russian

The first SQUID magnetocardiograph developed in the Soviet Union (at the Neutron Physics Laboratory of the Dubna Nuclear Research Institute) is briefly described, and its advantages in relation to conventional cardiographs are discussed The magnetocardiogram, obtained using this instrument, of a healthy 35-year-old man is presented, and is found to clearly delineate the QRS complex and the T-wave B J

A82-36307 * A specific radioimmunoassay for osteocalcin with advantageous species crossreactivity. P Patterson-Allen, C E Brautigam, C W Asling (California, University, San Francisco, CA), R E Grindeland, and P X Callahan (NASA, Ames Research Center, Moffett Field, CA) *Analytical Biochemistry*, vol 120, 1982, p 1-7 17 refs Grant No NCA2-OR-665-004

The specificities of immunoassays to rat and bovine osteocalcin are examined Extracts of noncalcified tissues and tissue fractions are unreactive to the antibody, with the exception of the kidney, in which the reactive component appears to be identical with osteocalcin by gel filtration and dose dilution analysis The assays, developed against protein isolated from bone, are also demonstrated to be reactive to the native protein (bone in situ) and to osteocalcin in serum The assays are sensitive to less than 50 pg osteocalcin Intra- and interassay coefficients of variation are less than 6 8% The bovine antibody crossreacts with human, horse, monkey, baboon, and cat osteocalcin, while the rat antibody crossreacts with dog and mouse (Author)

A82-36319 Gravity, and metabolic scale effects in mammals. N Pace (California, University, Berkeley, CA) and A H Smith (California, University, Davis, CA) *Physiologist*, vol 24, no 6, 1981, p S-37 to S-40 23 refs

Scaling effects which occur in the increase of body size of mammals since the early Tertiary Period and which may be affected by interaction with a gravity field are discussed The influence of gravitational loading is considered in terms of an allometric relationship between metabolic heat production rate and total body mass It is noted that no explanation has been found for an observed 3/4 power low relationship between the rate and mass, although the body surface is known to increase as a 2/3 power of the body mass in mammals Attention is given to properties of thermal conductance, metabolic intensity, and thermoregulation which requires a 1/2 power scaling with size A compromise is asserted to have possibly occurred with the gravitational 1 0 power requirements The design of experiments to place animals in a 2 5 g environment to find if the 1 0 power ratio can be induced are described A shift in the power to a 1/2 value is indicated in a weightless environment M S K

A82-36320 * An electron-microscopic study of the brain of the fruit fly, Drosophila melanogaster, exposed to high-LET krypton /Kr-84/ particle radiation. F E D'Amelio, E V Benton (San Francisco, University, San Francisco, CA), L M Kraft, and J Miquel (NASA, Ames Research Center, Biomedical Research Div , Moffett Field, CA) *Acta Neuropathologica*, vol 57, 1982, p 37-44 14 refs Grant No NsG-2063

A82-36688 Studies on the interaction of pemoline and centrophenoxine with some flight factors (Badania nad oddzialywaniem pemoliny i centrofenoksyny z niektorymi czynnikami lotu). E Marks and W Swiecicki (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland) *Postepy Astronautyki*, vol 14, no 4, 1981, p 19-26 7 refs In Polish

Two sets of experiments were performed on 160 male Wistar rats, weighing 180-200 g The first set involved the effect of pemoline and two flight factors, i e hypobaric conditions and vibration, on the level of biogenic amines in the blood and brain tissue The second set of experiments involved the effects of hypobaric conditions and vibration on the level of pemoline and centrophenoxine in the blood and brain tissue Changes were found in the levels of these drugs under the effect of the flight factors, which suggested a change in the drug metabolism B J

A82-36689 Electrophysical and hemodynamic factors conditioning cardiac arrhythmias during centrifuging (Elektrofizjologiczne i hemodynamiczne przeslanki do zaburzen rytmu serca podczas badania na wirowce przeciazeniowej) L Kopka, R Dabrowa, and S Bojenko (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland) *Postepy Astronautyki*, vol 14, no 4, 1981, p 27-35 26 refs In Polish

Various factors affecting the functioning of the human cardiovascular system during centrifuging under positive Gz acceleration are discussed Particular attention is given to factors conditioning the occurrence of cardiac arrhythmias Difficulties in interpreting such data are discussed with reference to aerospace medical studies The necessity of making electrophysiological studies (using intracardial stimulation and His Bundle electrography) in some cases is pointed out B J

A82-36690 The effect of positive and negative ions of air on the content of catecholamines in the brain and adrenal glands (Wplyw dodatnich i ujemnych jonow powietrza na zachowanie sie katecholamin w mozgowiu i nadnerczach). R Bernat, W Banaszkiewicz, and G Straburzynski (Akademia Medyczna, Poznan, Poland) *Postepy Astronautyki*, vol 14, no 4, 1981, p 37-49 27 refs In Polish

The content of adrenaline (A), noradrenaline (NA), and dopamine (DA) in the brain and adrenal glands of Wistar rats exposed to positive and negative air ions during 3 6 or 9 weeks was experimentally studied Exposure to negative ions was found to produce a decreased NA content and an increased DA content in the brain Positive ions produced an increase in the content of NA and DA in the brain The content of A decreased in the adrenal glands of rats exposed to positive ions B J

A82-36691 The effect of threat on psychomotor and intellectual performance depending on characteristics of temperament (Wplyw zagrozenia na efektywnosc funkcjonowania psychomotorycznego i intelektualnego w zaleznosci od charakterystyki temperamentalnej) J Maciejczyk (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland) *Postepy Astronautyki*, vol 14, no 4, 1981, p 51-63 10 refs In Polish

Studies were carried out to evaluate the performance of pilot candidates, both differentiated and nondifferentiated in traits of temperament, in regard to psychomotor and intellectual skills in threat situations Threatful stress was produced by testing candidates on a centrifuge for the first time in their lives The anxiety level was measured before and after centrifuging It is shown that stress associated with the anticipatory danger situation significantly reduces the level of performances of psychomotor and intellectual tasks No differences in psychomotor and intellectual performance was found in subjects differentiated according to traits of temperament B J

A82-36951 Manned systems design: Methods, equipment, and applications; Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980. Conference sponsored by NATO Edited by J Moraal (Centrale Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek, Instituut voor Zintuigfysiologie, TNO, Soesterberg, Netherlands) and K -F Kraiss (Forschungsgesellschaft für angewandte Naturwissenschaften, Forschungsinstitut für Anthropotechnik, Wachtberg-Werthhoven, West Germany) New York, Plenum Press (NATO Conference Series III Human Factors Volume 17), 1981 496 p $35

Papers are presented in the areas of conceptual and analytical approaches, performance measurement and simulator design and evaluation in the design of manned systems Specific topics include the proper incorporation of human factors in the design process, simulation languages used in manned systems design, eye movement measurements used in the evaluation of visual performance, techniques for electophysiological measurements, human movement analysis in workplace design, and the design of a programmable multiple flight simulator facility A L W

A82-36952 Methods - Past approaches, current trends and future requirements. D A Topmiller (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH) In Manned systems design Methods, equipment, and applications, Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980 New York, Plenum Press, 1981, p 3-31 8 refs

The historical development, current technologies and practices and projected future directions of the discipline of human factors engineering are reviewed The origins of the field in the United States in response to the increasing complexity of weapon systems in World War II and its initial development using the tools of experimental psychology are outlined, and limitations to the early design handbook approach and the improvements brought by the introduction of an interdisciplinary approach with influences from computer and information science are considered Current trends in reference data source, experimental design, human-machine integration performance measurement, modelling, engineering design simulation and procedural technologies are then assessed based on responses to a questionnaire survey Future requirements for methods, technologies and data bases for man-machine interface design and overall systems design are then discussed as derived from evaluations of human factors needs and projected shortfalls in computer technology A L W

A82-36956 The human operator simulator - An overview. N E Lane (U S Naval Material Command, Naval Air Development Center, Warminster, PA), M I Strieb (Analytics, Inc , Willow Grove, PA), F A Glenn, and R J Wherry In Manned systems design Methods, equipment, and applications, Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980 New York, Plenum Press, 1981, p 121-152 39 refs

The structure and operational characteristics of the Human Operator Simulator (HOS), a model which combines evaluations of overall man-machine system performance with detailed simulations of operator functioning within the system, are reviewed HOS is a collection of digital computer programs which allows for the simulation of a total system, including operator, hardware and software, and external data sources, performing a complex mission Definitions of equipment characteristics and operator procedures are communicated to HOS through the Human Operator Procedures (HOPROC) language The HOS model converts the generalized system defined by the HOPROC procedures into a simulation of a specific simulation event resulting in a time history of the event which is built up from the times required to execute detailed micromodels of information absorption, information recall, mental computation, decision making, anatomy movement, control manipulation and relaxation The HOS system has been validated on levels corresponding to the descriptive capabilities of HOPROC language, the validity of the micromodels, part-task simulations and full-scale simulations A L W

A82-36957 SAINT, a digital simulation language for the study of manned systems. G P Chubb (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH) In Manned systems design Methods, equipment, and applications, Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980 New York, Plenum Press, 1981, p 153-179 21 refs

The basic features of the SAINT (Systems Analysis of Integrated Networks of Tasks) simulation language for the digital modeling of manned systems are presented Following a brief survey of the evolution of SAINT based on experience gained from the use of the Siegel-Wolf two-man operator simulation model, which viewed system performance in terms of operator activities over time, the character of SAINT is discussed, noting its capability of modeling the man, machine or both as discrete events, continuous events or both, and the three levels of SAINT constructs Examples of five applications of SAINT to simple cases are presented which demonstrate the range of modeling issues that may be approached, and a more complex model which includes the effects of man on machine and vice versa is formulated for the example of aircraft position fix updating using radar imagery Possible improvements which would facilitate SAINT applications are noted A L W

A82-36959 Statistical techniques for instrument panel arrangement. W W Wierwille (Virginia Polytechnic Institute and State University, Blacks-

burg, VA) In Manned systems design Methods, equipment, and applications, Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980 New York, Plenum Press, 1981, p 201-218 28 refs

Four important aspects of the problem of the proper arrangement of instruments on a panel are discussed The first involves the relationships that exist among the various statistical factors associated with instrument panel arrangement A definition of link values, which express the magnitude of direct eye transitions between two instruments, is presented which allows them to be derived from both the joint probability of transition from one instrument to another or the probability of fixation on a given instrument The problem of record length estimation in the collection of eye fixation data is then addressed, and the double sampling and work sampling approaches are outlined Consideration is then given to the subclasses of criteria that may be used for optimization and to the execution of the optimization process itself, which in all but the most complex cases may be performed by exhaustive search methods Important problems remaining in the areas of control and control/display arrangement and in arrangement and formatting with CRT displays are indicated A L W

A82-36960 A method for semi-automatic analysis of eye movements. F V Schick and H Radke (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Brunswick, West Germany) In Manned systems design Methods, equipment, and applications, Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980 New York, Plenum Press, 1981, p 221-234, 5 refs

A semiautomatic method for the analysis of eye mark recording data obtained in studies of the eye-fixation points when the observer's head is allowed to move freely is presented The method is used with videotape recordings of subject eye motions as determined from the reflection of a V-shaped spot of light off the cornea, and head movements as determined using a lens attached to the center of a face mask In constrast to time-consuming manual methods for the analysis of the analog methods, and fully automatic analysis, both of which are not applicable in cases where individual visual targets are changing their positions, the semiautomatic method works with categories of visual targets rather than their exact locations Information, corresponding to the dwell times and motion sequences of the eye point of regard in the target areas, is entered into a digital computer from the analog record by an observer depressing a switch corresponding to each visual area for the duration of the fixation The semiautomatic method has been proven practicable in studies of the visual behavior of airline pilots performing flight tasks in a simulator A L W

A82-36961 Narrowing of the visual field as an indicator of mental workload M Voss (Fraunhofer-Institut für Informations- und Datenverarbeitung, Karlsruhe, West Germany) In Manned systems design Methods, equipment, and applications, Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980 New York, Plenum Press, 1981, p 235-250 14 refs Research supported by the Forschungsvereinigung Automobiltechnik and Bundesanstalt fur Strassenwesen

A method has been developed which uses peripheral visual performance as an indicator of mental workload due to the processing of central visual information Peripheral vision is measured according to the detectability of a set of lights mounted in a special spectacle frame while the subject is performing the main visual task Detection rate is measured as a function of presentation angle in the horizontal meridian, with the functional field defined by the presentation angle where 50% of the stimuli are detected, so that a narrowing of the functional field, or tunnel vision, may be observed Experiments involving subject responses to eight streams of binary signals, performance in a driving simulator and automobile driving in an actual situation have demonstrated a decrease in the detectability of peripheral visual stimuli in the presence of increased visual workloads A L W

A82-36962 Eye movement measurement in the assessment and training of visual performance. H Widdel and J Kaster (Forschungsgesellschaft für angewandte Naturwissenschaften, Forschungsinstitut für Anthropotechnik, Wachtberg-Werthhoven, West Germany) In Manned systems design Methods, equipment, and applications, Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980 New York, Plenum Press, 1981, p 251-270 41 refs

Measurements of eye movements during a series of search tasks are presented which were used to evaluate the influences of training in a specific search pattern on search performance Oculometer measurements were performed during searches for a target symbol among neutral symbols of various densities spread randomly over a screen before visual training, in the course of training sessions in exhaustive search with and without a visual aid, and following training Search times are found to show a learning effect in subjects trained with the scan aid, and to increase with symbol density No significant differences in fixation duration are found between the pre- and post-test situations, although individuals with a high performance level generally exhibited a shorter fixation duration than those with lower performances Estimations of the visual lobe area according to the probability of successful fixations in a given area show a more efficient visual lobe area for subjects with higher search performance than those with lower performance Finally, measurements of eye movement patterns show a qualitative difference between the groups trained with and without a scan pattern, reflecting search performance A L W

A82-36963 Physiological monitoring and the concept of adaptive systems. F E Gomer (McDonnell Douglas Astronautics Co , Engineering Psychology Dept , St Louis, MO) In Manned systems design Methods, equipment, and applications, Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980 New York, Plenum Press, 1981, p 271-287 35 refs Contract No MDA903-78-C-0181

Current trends in the development of manned systems for aerospace applications are reviewed particularly as they relate to provisions for the use of the adaptive capabilities of computer-based systems based on the results of physiological monitoring The replacement of dedicated, single-purpose instruments and controls with multipurpose displays and keyboards brought about by increasing task demand and space limitations is discussed for the example of the instrument panel of a fighter-bomber aircraft, and it is noted that despite these improvements, there is concern that pilot mental workload problems will remain significant Possible adaptive procedures that may be implemented to alleviate the workload are indicated, and the various physiological methods that may be used to detect momentary changes in mental function are examined, including *electroencephalographic event-related potentials and contingent negative variation*, and eye movement measurements The current status of electrophysiological measurements during flight simulations is indicated A L W

A82-36964 Electrophysiological measurement techniques. G Rau (Helmholtz Institute for Biomedical Engineering, Aachen, West Germany) In Manned systems design Methods, equipment, and applications, Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980 New York, Plenum Press, 1981, p 289-304 12 refs

Technical aspects of the utilization of electrophysiological techniques are discussed The frequency range and amplitude distribution of the signals commonly detected by surface electrodes are summarized, and problems in measurement accuracy associated with the complex resistance of the skin, the electrode and the electrode-electrolyte transition, and the cable connecting the electrodes to the amplifier are examined Factors in amplifier design which may then be used to reduce these difficulties are considered, and improvements to the signal to noise ratio represented by the techniques of optical coupling, digital filtering and artifact detection and suppression are indicated Results of the application of these improvements are presented for the case of a technique for the measurement of visual evoked potentials, and a microcomputer system which may be used for the acquisition and processing of electrophysiological signals in a laboratory environment is described A L W

A82-36965 Electromyography and applications. K -P Gärtner (Forschungsgesellschaft fur angewandte Naturwissenschaften, Forschungsinstitut fur Anthropotechnik, Wachtberg-Werthhoven, West Germany) In Manned systems design Methods, equipment, and applications, Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980 New York, Plenum Press, 1981, p 305-321 20 refs

Electromyography is discussed as a reliable objective method for the measurement of muscular activity and its relation with factors that influence work performance The physiological basis of electromyography, which shows the summed activity of single muscle fibers, single motor units or several motor units, is explained, and techniques for the use of surface electromyography, which is preferred in ergonomics due to its noninvasive character, are presented Techniques for the analysis of electromyographic signals are then examined, with attention given to rectifying, integrating and averaging by digital or analog methods and frequency analysis Finally, applications of electromyography in man-machine systems as an indicator of muscular strain, as biofeedback and as a tool in ergonomic evaluations are discussed A L W

A82-36966 Analysis of human movements for workplace design. K -P Holzhausen (Forschungsgesellschaft für angewandte Naturwissenschaften, Forschungsinstitut für Anthropotechnik, Wachtberg-Werthhoven, West Germany) In Manned systems design Methods, equipment, and applications, Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980 New York, Plenum Press, 1981, p 337-362 37 refs

Experimental design, tools, and analytical techniques for establishing an anthropometric data base for movement and distance parameters for human functions in the workplace are reviewed Specific attention is given to the range of human actions in a seated position, a position relevant to control consoles and cockpits, with data being accumulated on human stature, reach, and range of motions, as well as on the patterns of movement Technical approaches to cataloging the motions are examined, including mechanical, photographic, optoelectronic, and fully electronic monitoring and recording Stereophotographic methods allow the investigation of movements with three-dimensional trajectories by use of two cameras Attention is given to static models such as BOEMAN, linkman, COMBIMAN, and the Crewstation Geometry Evaluator systems for

computer aided design of cockpit interiors Applications of the techniques to solving workplace inefficiencies are illustrated with examples M S K

A82-36967 * Evaluation of synthesized voice approach callouts /SYNCALL/. C A Simpson (Psycho-Linguistic Research Associates, Menlo Park, CA) In Manned systems design Methods, equipment, and applications, *Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980* New York, Plenum Press, 1981, p 375-393 42 refs Research supported by the National Research Council, Grants No NGL-05-046-002, No NGR-45-003-108

The two basic approaches to the generation of 'synthesized' speech include a utilization of analog recorded human speech and a construction of speech entirely from algorithms applied to constants describing speech sounds Given the availability of synthesized speech displays for man-machine systems, research is needed to study suggested applications for speech and design principles for speech displays The present investigation is concerned with a study for which new performance measures were developed A number of air carrier approach and landing accidents during low or impaired visibility have been associated with the absence of approach callouts The study had the purpose to compare a pilot-not-flying (PNF) approach callout system to a system composed of PNF callouts augmented by an automatic synthesized voice callout system (SYNCALL) Pilots were found to favor the use of a SYNCALL system containing certain modifications G R

A82-36968 Evaluating simulator validity J Moraal (Centrale Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek, Instituut voor Zintuigfysiologie TNO, Soesterberg, Netherlands) In Manned systems design Methods, equipment, and applications, Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980 New York, Plenum Press, 1981, p 411-426 13 refs

Problems associated with the use of simulator validation criteria are discussed with reference to three studies concerning a ship navigator simulator, a driving simulator for research purposes, and a tank driver training simulator It is emphasized that the functional correspondence or validity should be defined in relation to the purpose of the simulator Thus, a training simulator is valid as long as transfer-of-training to the real system is achieved, while a research simulator is valid when experimental results of the simulator and the real system are congruent, so that performance predictions can be made from one to the other It is also pointed out that the functional correspondence can be improved by increasing the physical correspondence V L

A82-36971 † Motion sickness, its prevention and treatment (Ukachivanie, ego profilaktika i lechenie). M P Efremenko Moscow, Izdatel'stvo DOSAAF SSSR, 1981 72 p In Russian

The causes and symptoms of motion sickness are discussed on the basis of a survey of the literature Methods of preventing and treating the malaise are suggested The various forms of motion sickness are delineated, and a chart containing 20 symptoms is included It is shown that training programs can lower the incidence of motion sickness among sailors and aircrew members C R

A82-36976 † Hormonal mechanisms of adaptation and training (Gormonal'nye mekhanizmy adaptatsii i trenirovki). A A Viru Leningrad, Izdatel'stvo Nauka, 1981 156 p 639 refs In Russian

The role of hormones in the adaptation response in general and in the mechanism of general adaptation and the transfer of short-term adaptations to the long term in particular is discussed with particular emphasis on the glucocorticoid hormones The historical development of the concept of general, nonspecific adaptation starting from the work of Selye (1936), which showed the importance of the hypophyseal-adrenocortical system, is reviewed, and the adaptive functions of this system are examined in detail, with attention given to the control of the stress reaction and the mechanism of action of the glucocorticoids Interactions of various systems, including the endocrine systems and the central nervous system, in the mechanism of the general adaptation syndrome are also considered Finally, the problem of the development of long-term adaptation is examined for the model of physical training A L W

A82-37182 Training maintenance technicians for troubleshooting - Two experiments with computer simulations W B Johnson and W B Rouse (Illinois, University, Urbana, IL) *Human Factors*, vol 24, June 1982, p 271-276 13 refs Contract No MDA903-79-C-0421

Aviation maintenance trainees participated in two experiments designed to assess the relative effectiveness of traditional instruction versus two types of computer simulation in the context of aircraft power-plant troubleshooting Simulations ranged in nature from abstract, context-free problems to those involving specific aircraft power plants Traditional instruction included reading assignments, television programs tailored to aircraft power-plant troubleshooting, and on-line quizzes The first experiment compared the three training methods, and the second considered a mixture of the two computer simulations versus traditional instruction The primary conclusion was that an appropriate combination of low- and moderate-fidelity computer simulations can provide sufficient problem-solving experience to be competitive with the more traditional lecture/demonstration form of instruction (Author)

A82-37183 Screening designs used to estimate the relative effects of display factors on dial reading. H O Whitehurst (California State University, Northridge, CA) *Human Factors*, vol 24, June 1982, p 301-310 6 refs

Two experiments were conducted to determine if screening designs could be used to obtain reliable estimates of the relative strength of effect of several independent variables Specifically, the effects of eight independent variables on the speed and accuracy of reading moving-pointer, fixed-scale dials were tested Additional objectives were to determine if the black-white relationship of the scale markers and dial background affects dial-reading performance or subject preferences The percentage of the variance accounted for by each main effect was very similar across screening designs The progression of the numbers on the scale had by far the strongest effect Interpolation and scale unit length also had relatively strong effects, while scale orientation, marker width, pointer design, clutter, and scale number location had weak to trivial effects Black-on-white and white-on-black dials were read at about the same speed, but more errors were made while subjects read the black-on-white, even though they preferred the black-on-white dials (Author)

A82-37184 Locus of the stimulus to visual accommodation - Where in the world, or where in the eye. J C Hull, S N Roscoe (New Mexico State University, Las Cruces, NM), and R T Gill (Wright State University, Dayton, OH) *Human Factors*, vol 24, June 1982, p 311-319 15 refs Contract No F49620-77-C-0117, Grant No AF-AFOSR-80-0024

Eight observers judged the apparent size of a 'moon' simulated by projecting a collimated disk of light just above the horizon in real scenes and virtual images In each of three viewing conditions, Back-lighted Screen (collimated), Back-projected Photograph (collimated), and Natural Campus Scene, masks inserted in the viewing aperture of the 'moon machine' obscured various horizontal bands of the lower half of the visual field With each experimental manipulation, both the perceived size of the moon and the observer's visual accommodation distance (measured with a laser optometer) covaried systematically From the combined results of two experiments, it appears that (1) viewing a collimated image of a natural vista does not have the same effects as viewing the actual scene, (2) the retinal locus of visible texture is the primary determinant of perceived size of objects of constant visual angle embedded in natural scenes, and it has a strong effect on accommodation to virtual images, and (3) the overall correlation between apparent, or perceived, size and accommodation shift from the individual's dark focus, averaged across observers, approaches unity (Author)

A82-37185 Using realistic sensor, target, and scene characteristics to develop a target acquisition model. B L Sibernagel (Allen Corporation of America, Orlando, FL) *Human Factors*, vol 24, June 1982, p 321-328

This paper provides a model of target acquisition that will aid in the design of electro-optical detection devices Twelve subjects, highly skilled in target detection, located targets in 32 terrain scenes taken from a realistic terrain board Independent variables included display resolution, field of view, target contrast, target range, number of targets, and scene complexity All experimental variables had a significant effect on target detection performance A regression equation is presented, which can be used to predict detection time given the various sensor, target, and scene characteristics (Author)

A82-37186 Perceptual discriminability as a basis for selecting graphic symbols. R E Geiselman (California, University, Los Angeles, CA), B M Landee, and F G Christen (Perceptronics, Inc , Woodland Hills, CA) *Human Factors*, vol 24, June 1982, p 329-337 6 refs Army-supported research

The purpose of this research was to develop a performance-based criterion for selecting among alternative symbols to be used in graphic displays The specific criterion developed was an index of perceptual discriminability Through regression analyses of an intersymbol similarity-rating matrix, it was concluded that symbols are judged more or less similar on the basis of the number of shared versus unique configural attributes (an X, a triangle, etc), as opposed to primitive attributes (number of lines, arcs, etc) An easy-to-use discriminability-index formula was derived from the regression analysis involving the configural attributes, and this formula was used to predict the results of an experiment involving a search for specific symbols embedded in an array Indices obtained from a formula such as the one developed here could be used as part of the basis for choosing among alternative candidate symbols for inclusion in an existing symbol domain (Author)

A82-37187 Noise and annoyance - A new methodology. G M Corso and M E Moomaw (Georgia Institute of Technology, Atlanta, GA) *Human Factors*, vol 24, June 1982, p 339-345 5 refs

The effects of noise intensity on annoyance are investigated in two experiments involving the use of a visual signal to designate the impending occurrence of a 1000 Hz pure tone The noise was timed to occur only if response time was greater than 250 msec, and to terminate with the response The first experiment's

results indicate that the no-noise condition and 50 dBA values differed significantly from the 90 dBA value in terms both of number of avoidance responses and response latencies, implying that avoidance and latency are indicators of annoyance The second experiment investigated range effects on the number of avoidance responses and their latencies Significant differences are noted between a group exposed to 50, 60 and 70 dBA and another exposed to 70, 80 and 90 dBA, suggesting that avoidances and latencies are a function of both absolute intensity value and the range of intensities used Attention is given to the advantages and disadvantages of the avoidance procedure O C

A82-37372 † The effect of space flight factors on quiescent nuclei of certain plant and animal test objects (Vliianie faktorov kosmicheskogo poleta na pokoiashchiesia iadra nekotorykh rastitel'nykh i zhivotnykh model'nykh ob'ektov). N L Delone, V V Antipov, and B I Davydov *Kosmicheskie Issledovaniia,* vol 20, May-June 1982, p 489-492 10 refs In Russian

The phenomenon of quiescent or silent cell nuclei was examined in tests performed on plant and animal test objects on a variety of spacecraft (Vostok-3, Soyuz-4, Cosmos-690, Cosmos-110, etc) the effect of space flight factors on (1) the 'reanimation' of seeds of higher plants that had lost their germinating ability, (2) the liver cells of turtles (Testudo horsfieldi Gray), and (3) the generative nuclei of the binuclear pollen Tradescantia paludosa were examined The phenomenon of quiescent or silent cell nuclei, where no reading of genetic information occurs, was observed in all three types of organisms under space flight conditions It is suggested that this silent state is associated with a loss of feedback between the nucleus and the cytoplasm B J

A82-37420 * Beta decay and the origins of biological chirality - Experimental results. D W Gidley, A Rich, J Van House (Michigan, University, Ann Arbor, MI), and P W Zitzewitz (Michigan, University, Dearborn, MI) *Nature,* vol 297, June 24, 1982, p 639-643 25 refs NSF-NASA-supported research

Preliminary experimental results are presented of an investigation of the possible role of preferential radiolysis by electrons emitted in the beta decay of radionuclides, a parity-nonconserving process, in the universal causation of the optical activity of biological compounds Experiments were designed to measure the asymmetry in the production of triplet positronium upon the bombardment of an amino acid powder target by a collimated beam of positrons as positron helicity or target chirality is reversed No asymmetry down to a level of 0 0007 is found in experiments on the D and L forms of cystine and tryptophan, indicating an asymmetry in positronium formation cross section of less than 0 01, while an asymmetry of 0 0031 is found for leucine, corresponding to a formation cross section asymmetry of about 0 04 A L W

A82-37421 Beta decay and the origins of biological chirality - Theoretical results R A Hegstrom (Wake Forest University, Winston-Salem, NC) *Nature,* vol 297, June 24, 1982, p 643-647 13 refs

A dynamical mechanism is found whereby a dissymmetric molecule and its mirror image are ionized at different rates by longitudinally polarized electrons such as produced by nuclear beta decay An enhancement is predicted for molecules containing heavy atoms Order-of-magnitude estimates indicate that the asymmetric effect of this mechanism may be detectable by current experiments on positronium formation (Author)

A82-37423 * Methane flux in the Great Dismal Swamp. R C Harriss, D I Sebacher (NASA, Langley Research Center, Hampton, VA), and F P Day, Jr (Old Dominion University, Norfolk, VA) *Nature,* vol 297, June 24, 1982, p 673, 674 33 refs NASA-supported research, NSF Grant No DEB-77-08609

The paper reports measurements made over a 17-month period of the methane flux in the Great Dismal Swamp of Virginia in light of the potential implications of variations in atmospheric methane concentrations Gas flux measurements were made by a technique combining a gas filter correlation IR absorption analyzer with improved sampling chambers that enclose a soil area under conditions ranging from totally flooded soils to dry soils resulting from drought conditions Methane emissions are found to range from 0 0013 g CH4/sq m per day to 0 019 g CH4/sq m per day, depending on temperature and season, when the soil is in a waterlogged state During drought conditions, the peat soils in the swamp were a sink for atmospheric methane, with fluxes from less than 0 001 to 0 005 g CH4/sq m per day and decreasing with decreasing temperature Results illustrate the potential complexity of the processes which regulate the net flux of methane between wetland soils and the atmosphere A L W

A82-37926 Fibrinopeptide A after strenuous physical exercise at high altitude. P Bärtsch, E K Schmidt, and P W Straub (Bern, Universität, Berne, Switzerland) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology,* vol 53, July 1982, p 40-43 33 refs

Alterations in blood coagulation following exhaustive exercise at high altitude are studied in view of the possible role of thrombosis in the pathology of acute mountain sickness Subjects resident at an altitude of 600 m were transported by railroad to an altitude of 3457 m, where half of them underwent bicycle ergometer exercise to exhaustion while the other half served as controls Pre-exercise blood samples taken 1 hour after arrival at altitude showed no significant alterations in coagulation parameters as compared with samples taken at 600 m Both immediately after and 1 hour after exercise, the clotting times and euglobin lysis times were shortened and factor VII activity was elevated in the exercise group but not the controls, although there was no significant difference in fibrinopeptide A levels and the ethanol gelation test remained negative No rise in fibrin(ogen) degradation products or fibrin(ogen) fragment E was found It is therefore concluded that strenuous exercise at altitude does not lead to a rise in thrombin-mediated fibrin formation in young healthy males A L W

A82-37927 Comparison of human vocal cord movements during isocapnic hypoxia and hypercapnia. S J England, D Bartlett, Jr , and S L Knuth (Dartmouth College, Hanover, NH) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology,* vol 53, July 1982, p 81-86 25 refs Grant No NIH-HL-19827

Respiratory vocal cord movements were analyzed in healthy human subjects during air breathing and in isocapnic hypoxia and hypercapnia In the majority of experiments, expiratory glottic narrowing was substantially greater during hypoxia than during hypercapnia Because ventilations were carefully matched under these two conditions, it is concluded that hypoxic stimulation of peripheral chemoreceptors favors expiratory glottic narrowing and leads to a relatively high laryngeal airflow resistance In contrast, hypercapnia is accompanied by low expiratory laryngeal resistance Similar rates of expiratory airflow with these two stimuli must be achieved by different balances of the factors that determine this flow (Author)

A82-37928 Brain hypoxia and control of breathing - Role of the vagi. R W Chapman, T V Santiago, and N H Edelman (Rutgers University, Piscataway, NJ) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology,* vol 53, July 1982, p 212-217 27 refs Grants No NIH-HL-16022, No NIH-HL-07647

The role of vagally mediated reflexes in the ventilatory response to progressive brain hypoxia secondary to carboxyhemoglobinemia is investigated Measurements of ventilatory parameters were made at different levels of carboxyhemoglobinemia before and after vagotomy in unanaesthetized goats Vagotomy is found to change the breathing pattern to a slower, deeper pattern, while increasing resting heart rate and arterial pressure under normoxia Carboxyhemoglobin levels greater than 45% initiate a large increase in respiratory rate and a lesser increase in inspiratory minute volume, the magnitudes of which are reduced somewhat after vagotomy Whereas carboxyhemoglobinemia had a biphasic effect on the lung inflation reflex prior to vagotomy, increasing the ratio of the inspiratory duration of a fully occluded breath to that of a spontaneous breath at low carboxyhemoglobin levels and reducing the ratio to unity at high levels, vagotomy led to the constancy of the ratio at unity for all levels of carboxyhemoglobin, indicating the abolition of the lung inflation reflex Results indicate that contributions from vagally mediated mechanisms to the overall ventilatory response to brain hypoxia are small in magnitude A L W

A82-37929 Muscle weakness following dynamic exercise in humans. C T M Davies and M J White (Queen's Medical Centre, Nottingham, England) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology,* vol 53, July 1982, p 236-241 19 refs

The effects of dynamic exercise on muscular force generation in response to electrical stimulation are investigated in subjects performing 1 hour of level running and uphill walking at a gradient of 25% on a treadmill, and box stepping on and off a 0 5-m platform Tension development was measured during both submaximal and supramaximal twitch and tetanic stimulation of the triceps surae before and after exercise At submaximal stimulation voltages, running and walking are found to enhance twitch and tetanic responses, however the supramaximal time to peak tension, twitch tension and tetanic tensions were reduced, with the reduction in tetanus at 100 Hz associated with a decrease in maximal voluntary contraction Muscular functions were found to return to normal 2 hours after running and walking, in contrast to box-stepping, which produced a more pronounced weakening which lasted at least 22 hours Results illustrate the difficulties in using submaximal stimulation voltages and tetanic response ratios in studies of muscle function, and suggest that long-lasting muscle weakness is not associated with recovery from prolonged running or walking A L W

A82-37930 Brain extracellular fluid pH and blood flow during isocapnic and hypocapnic hypoxia. W F Nolan and D G Davies (Texas Tech University, Lubbock, TX) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology,* vol 53, July 1982, p 247-252 35 refs Research supported by the Tarbox Research Institute, Grant No NIH-HL-25984

The role of brain extracellular fluid pH in the regulation of the cerebrovascular response to hypoxia is studied by means of simultaneous measurements of extracellular fluid pH and blood flow during isocapnic and hypocapnic hypoxia Measurements of diencephalon and total brain blood flows were made by the radioactive microsphere technique concurrently with microelectrode determinations of extracellular fluid pH in the diencephalon in anaesthetized, paralyzed rabbits artificially ventilated with gas mixtures containing 11-12% O2 or 3 3%

CO2 and 9-10% O2 Diencephalon and total brain blood flow rates are observed to increase and vascular resistances to decrease after 4-6 minutes of isocapnic hypoxia, while extracellular fluid pH increased after the first minute and remained elevated for 20 min During hypocapnia, blood flow and vascular resistance remained constant as extracellular pH was elevated, while hypocapnic hypoxia led to a decrease in vascular resistance with no change in blood flow rate Results indicate that some factor other than H(+) concentration must mediate early hypoxic vasodilation A L W

A82-37968 Operator indoctrination during introduction of new or modified aviation life support systems /ALSS/. D W Call (U S Navy, Pacific Missile Test Center, Point Mugu, CA) *SAFE Journal*, vol 12, Summer 1982, p 6-9 8 refs Air Task A53153/054-4/2531100

Methods of effective operator indoctrination on the proper use of new or modified items of ALSS are presented Carefully prepared and used operator indoctrination packages in various formats (slides with narratives, video tapes, demonstrators, etc) can be a significant factor in helping aircrewmen understand why ALSS are being introduced as well as how to use them, thus increasing the chances for proper use during an emergency The operator indoctrination package for the 'Personal Parachute Four-Line Release System', developed by the Pacific Missile Test Center, is used as a model to show the application of this training concept N B

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STAR ENTRIES

N82-26951# Turku Univ (Finland)
SPIN IMAGING EQUIPMENT FOR SMALL ANIMAL EXPERIMENTS Physical Lab
P H Oksman M E S Komu, E K Koivula, M Punkkinen, and Vaeinoe Hovi, ed 1981 14 p refs
(ISBN-951-41-0420-X, ISSN-0066-2003) Avail NTIS HC A02/MF A01

A spin imaging equipment to study small animals is described The homogenization of the magnetic field and to the field gradient coils and currents are examined The currents and also a substantial part of the image formation, based on the sensitive point method, are controlled by a microprocessor Cross-sectional pictures of an olive and a rat are shown E A K

N82-26952*# BioTechnology, Inc , Falls Church Va
USSR SPACE LIFE SCIENCES DIGEST, VOLUME 2, NO 3 Quarterly Review
Courtland S Lewis Sep 1981 55 p refs
(Contract NASw-3223)
(NASA-CR-168582 NAS 1 26 168582) Avail NTIS HC A04/MF A01 CSCL 05A

Soviet scientists are making significant contributions to the field of space medicine and biology through their active manned space program, frequent biosatellites, and extensive ground-based research An overview of the developments and direction of the USSR Space Life Sciences Program is provided L F M

N82-26953*# BioTechnology Inc , Falls Church Va
USSR SPACE LIFE SCIENCES DIGEST, VOLUME 2, NO. 4 Quarterly Review
Courtland S Lewis and Kristy Donnelly Dec 1981 59 p refs
(Contract NASw-3469)
(NASA-CR-168691 NAS 1 26 168691) Avail NTIS HC A04/MF A01 CSCL 05A

Soviet scientists are making significant contributions to the field of space medicine and biology through their active manned space program, frequent biosatellites and extensive ground-based research An overview of the developments and direction of the USSR Space Life Sciences Program is provided L F M

N82-26954*# Kentucky State Univ Frankfort Dept of Biology
ZOOLOGICAL EFFECTS OF VARIATIONS IN ATMOSPHERIC OXYGEN LEVELS Final Technical Report
Gerrit Kloek Jun 1982 25 p refs
(Grant NAG10-00801)
(NASA-CR-169020, NAS 1 26 169020) Avail NTIS HC A02/MF A01 CSCL 06B

The role of certain gene enzymes in survival in modified atmospheres was examined Chromosome morphology was studied Mortality and life span were measured Equipment to deliver various gas mixtures to the flies was designed and fabricated To study the gene enzymes a technique called starch gel electrophoresis was needed Equipment and supplies for this work and the study of chromosome morphology was available on the market, although some of the equipment was fabricated to save the project money Author

N82-26955*# *California Inst of Tech , Pasadena Seismological* Lab
IMPACT OF AN ASTEROID OR COMET IN THE OCEAN AND EXTINCTION OF TERRESTRIAL LIFE
Thomas J Ahrens and John D OKeefe 1982 21 p refs
(Grant NsG-7129)
(NASA-CR-169086, NAS 1 26 169086) Avail NTIS HC A02/MF A01 CSCL 06C

Finite difference calculations describing the impact mechanics associated with a 10 to 30 km diameter silicate or water object impacting a 5 km deep ocean overlying a silicate solid planet demonstrate that from 12 to 15% of the bolide energy resides in the water It is speculated that minimal global tsunami run-up heights on the continents would be 300-400 meters, and that such waves would inundate all low altitude continental areas, and strip and silt-over virtually all vegetation As a result the terrestrial animal food chain would be seriously perturbed This could in turn cause extinction of large terrestrial animals L F M

N82-26956# Army Armament Research and Development Command, Aberdeen Proving Ground, Md Chemical Systems Lab
THE SUBCHRONIC INHALATION TOXICITY OF POLYETHYLENE GLYCOL 200 IN THE RAT AND MOUSE Technical Report, Oct. 1979 - Oct 1980
J W Crook, P D Hott, A E Cooper, E G Cummings, S A Thomson, R L Farrand, C Lilly D H Heitkamp, and J T Weimer Dec 1981 24 p refs
(DA Proj 1L1-62622-A-554-4E)
(AD-A110668 ARCSL-TR-81051) Avail NTIS HC A02/MF A01 CSCL 06/20

In this study mice and rats were repeatedly exposed to concentrations of either 100 mg/cu m or 1000 mg/cu m of PEG 200 aerosol for 6 hours a day, 5 days a week for up to 13 weeks The mice and rats did not appear to have any lesions related to the experimental procedure No biologically consistent significant alterations in blood chemistry hematology, or pulmonary resistance were found No mutations or pathological abnormalities could be attributed to exposure to PEG 200 The data resulting from these studies may be useful in the derivation of airborne control limits for protection of personnel Author (GRA)

N82-26957# Army Research Inst of Environmental Medicine, Natick, Mass Experimental Pathology Div
FREEZE-THAW INDUCED DAMAGE TO ENDOTHELIAL CELLS IN VITRO. 1 DEVELOPMENT OF A SUITABLE SYSTEM
Lynn R Trusal, Carol J Baker, and Albert W Guzman 25 Mar 1981 26 p refs
(DA Proj 3E1-61102-BS-10)
(AD-A111074, USARIEM-M-5/81) Avail NTIS HC A03/MF A01 CSCL 06/5

The study of freeze-thaw damage to endothelial cells necessitated the development of a suitable in vitro system After investigating various substrates, Leighton tubes containing a plastic coverslip proved to be the most versatile method for studying alterations to endothelial cells following thaw The polymethylpentene coverslip was the key to its versatility It was easily cut which allowed portions of the same monolayer to be processed for examination by phase contrast, brightfield, and both scanning and transmission electron microscopy At the same time, the attached handle allowed easy manipulation without disturbing the monolayer Also, following a freeze-thaw insult, endothelial cells remained better attached to the plastic substrate than to glass coverslips The Leighton tube itself was ideal for temperature studies because it was water tight which allowed submersion in refrigerated water baths The media covering the cells can be assayed for cellular enzymes released into the media In this manner biochemical markers from the same cells may be correlated with cellular structure Author (GRA)

N82-26958# Army Research Inst of Environmental Medicine, Natick Mass
ACUTE HEAT/EXERCISE STRESS IN RATS: EFFECTS ON FLUID AND ELECTROLYTE REGULATORY HORMONES
Ralph Francesconi and Milton Mager 20 Jan 1982 22 p refs
(DA Proj 3E1-61102-BS-10)
(AD-A110559, USARIEM-M-12/82) Avail NTIS HC A02/MF A01 CSCL 06/19

Adult, male rats were exercised (level treadmill, 9 14 m/min) *in the heat* (35 C, 30-35% *rh*) *until hyperthermic exhaustion* (T sub re = 42 5 - 43 C) ensued Blood samples (0 3 ml) were taken immediately prior to exercise in the heat (time 0), when T sub re reached 40 C (8 25 min treadmill time), when hyperthermic exhaustion occurred, and again when T sub re decreased to 40 C Plasma was separated and assayed for aldosterone, angiotensin I (plasma renin activity), and antidiuretic hormone (arginine-vasopressin) Plasma aldosterone levels were significantly ($p < 001$) elevated after 8 min of exercise and remained increased throughout the exercise and recovery periods Alternatively plasma angiotensin I levels were unaffected during exercise, but increased significantly ($p < 001$) during the recovery period Arginine-vasopressin concentrations were

likewise significantly ($p < 05$) elevated by completion of the exhaustive run and continued to increase during the recovery period We attributed these elevations in levels of the fluid and electrolyte regulatory hormones to part of an adaptational response to maintain or increase plasma volume during exercise in the heat Significant ($p < 001$) decrements in hematocrit ratio occurred during the exercise interval However we were unable to relate the ultimate ability of the animal to survive the heat/exercise-induced injury to the intensity of its hormonal response pattern to exercise in the heat GRA

N82-26959# Naval Postgraduate School, Monterey, Calif Dept of Operations Research

LOCAL SERIAL CORRELATION IN BEHAVIORAL STATES IN THE MOUSE

Gary S Richardson, Peter A W Lewis, Endel J Orav and William C Dement Sep 1981 21 p refs Prepared in cooperation with Stanford Univ , Calif

(Grant NIH-MH-27913, NR Proj 042-284)

(AD-A111021 NPS55-81-022) Avail NTIS HC A02/MF A01 CSCL 05/1

In the mouse Mus musculus, local (ultradian) serial correlation (LSC) within the sleep and wakefulness states varies significantly as a function of circadian phase The amplitude of the correlation function is greatest during the active phase of the mouse's diurnal cycle Additionally, mean LSC (averaged across circadian phase) is significantly positive and monotonically decreasing for a broad range of short lags (1-23 minutes) Thus there is no evidence of positive, periodically occurring peaks in the correlation function separated by patches of small or negative correlations that is characteristic of a rhythmic process of fixed period These findings challenge the concept that an ultradian oscillator plays a significant role in the temporal control of sleep-wake state Author (GRA)

N82-26960*# National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Tex

ABSORBENT PRODUCT AND ARTICLES MADE THEREFROM Patent Application

James V Correals and Frederic S Dawn inventors (to NASA) Filed 14 Apr 1982 14 p

(NASA-Case-MSC-18223-2 US-Patent-Appl-SN-368187) Avail NTIS HC A02/MF A01 CSCL 06B

An invention comprising a multi-layered absorbent article suitable for collecting body waste products is described Author

N82-26961*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt Md

APPARATUS FOR DISINTEGRATING KIDNEY STONES Patent Application

Donald S Friedman, inventor (to NASA) Filed 13 May 1982 13 p

(NASA-Case-GSC-12652-1, US-Patent-Appl-SN-377891) Avail NTIS HC A02/MF A01 CSCL 06B

A mechanical system for disintegrating urinary calculi, particularly an ultrasonic apparatus for fragmenting urinary calculi in situ is described The useful life of the wire probe in an ultrasonic kidney stone disintegration instrument is enhanced and prolonged by attaching the wire of the wire probe to the tip of an ultrasonic transducer by means of a clamping arrangement Additionally damping material is applied to the wire probe in the form of a damper tube through which the wire probe passes in the region adjacent the transducer tip Novelty is believed to reside in the combination of a grooved adjustable anvil in the transducer tip at the clamping point of the wire probe to lessen concentrated stresses in the wire and a vibrational damper system which minimizes lateral wire motion at the transducer tip while nevertheless transmitting linear motion which acts to prolong the useful life of the wire probe NASA

N82-26962*# National Aeronautics and Space Administration Marshall Space Flight Center, Huntsville Ala

PROSTHETIC OCCLUSIVE DEVICE FOR AN INTERNAL PASSAGEWAY Patent Application

John B Tenney Jr , inventor (to NASA) (Rochester General Hospital, N Y) Filed 23 Apr 1982 15 p Sponsored by NASA

(NASA-Case-MFS-25640-1 US-Patent-Appl-SN-371352) Avail NTIS HC A02/MF A01 CSCL 06B

A prosthetic device for occluding an internal passageway of the human body, for example for closing the urinary canal, is described The device includes a cuff having a backing collar and two isolated cuff chambers The fluid pressure of one chamber is regulated by a pump/value reservoir unit The other chamber is unregulated in pressure but its fluid volume is adjusted by removing or adding fluid to a septum/reservoir by means of a hypodermic needle Pressure changes are transmitted between the two cuff chambers via faying surfaces which are sufficiently large in contact area and thin as to transmit pressure generally without attenuation By adjusting the fluid volume of the septum the operating pressure of the device may be adjusted to accommodate tubular organs of different diameter sizes as well as to compensate for changes in the organ following implant without re-operation NASA

N82-26963# Indiana Univ , Bloomington School of Medicine

SLEEP DEPRIVATION AND EXERCISE TOLERANCE Annual Summary Report, 2 Jan. 1981 - 31 Jan 1982

Bruce J Martin Jan 1982 9 p refs

(Contract DAMD17-81-C-1023, DA Proj 3E1-62777-A-879) (AD-A113043, ASR-1) Avail NTIS HC A02/MF A01 CSCL 06/19

The effects of sleep deprivation on the ability of humans to tolerate standard forms of endurance exercise were investigated Standard techniques in human exercise physiology were utilized The results indicate that acute sleep loss of 30 to 36 hours (1) does not alter the maximal oxygen uptake while it does reduce maximal heart rate (2) leaves metabolic rate during exercise at a constant external work load unchanged, while heart rate is reduced and ratings of perceived exertion are elevated (3) reduces tolerance of prolonged heavy exercise at three-fourths of the maximal oxygen uptake by about 10% with wide variation noted among individuals and (4) to significantly change work loads selected for equal effort during short term heavy exercise It is concluded that acute sleep loss of 30 to 36 hours has relatively minor deleterious effects on endurance exercise performance Author

N82-26964*# Florida Univ , Gainesville Dept of Pathology

THE CLINICAL PRACTICE LIBRARY OF MEDICINE (CPLM) AN ON-LINE BIOMEDICAL COMPUTER LIBRARY SYSTEM DOCUMENTATION Final Report

Ralph R Grams 6 Jun 1982 131 p refs

(Grant NAG10-0004)

(NASA-CR-169018 NAS 1 26 169018) Avail NTIS HC A07/MF A01 CSCL 06E

A system designed to access a large range of available medical textbook information in an online interactive fashion is described A high level query type database manager, INQUIRE, is used Operating instructions, system flow diagrams database descriptions, text generation, and error messages are discussed User information is provided NW

N82-26965# Illinois Univ , Urbana Engineering Psychology Research Lab

THE PRODUCTION OF SPECIFIED ELECTROCORTICAL ACTIVITY AS A MEASURABLE TASK

Dennis B Beringer and Michael G H Coles Feb 1981 66 p refs

(Contract DACA88-80-C-0003, DA Proj 4A1-61102-AT-23, AF Proj 2313)

(AD-A111422, EPL-81-2/USACERL-81-1) Avail NTIS HC A04/MF A01 CSCL 05/10

Global electrocortial activity (alpha) was examined as a possible index of subtle environmental effects upon productivity in cognitive tasks A new model of biofeedback was proposed to account for the various effects described in the literature Although consistent with previous findings the model received no additional confirmation from the current study It was concluded that the measure was overly sensitive and unstable Other multivariate measurement schemes were suggested Author (GRA)

N82-26966# Air Force Aero Propulsion Lab , Wright-Patterson AFB, Ohio

TOXICOLOGY OF HIGH ENERGY FUELS

Michael G MacNaughton Dec 1981 16 p refs

(AF Proj 6302)

(AD-A111686 AFAMRL-TR-81-136) Avail NTIS HC A02/MF A01 CSCL 06/2

The development of new weapons systems high energy fuels, and aerospace materials presents a challenge to the health professional To avoid health hazards to Air Force personnel these

hazards must be identified early in the research phase of development before acquisition decisions are made This is only possible if the health professional works closely with the design engineers and scientists The Air Force program to develop high energy cruise missile fuels is a good example of close cooperation between scientists developing these fuels and toxicologists and environmental engineers responsible for research to assess the health and environmental consequences of their deployment throughout the Air Force A status report is given on the extensive toxicology data base research effort on these fuels Included are data on acute chronic and oncogenic exposures, mutagenic screening tests and emergency exposure limits Author (GRA)

N82-26967# Army Research Inst of Environmental Medicine, Natick Mass Altitude Research Div

DIFFERENTIATED RATINGS OF PERCEIVED EXERTION ARE INFLUENCED BY HIGH ALTITUDE EXPOSURE

Andrew J Young Allen Cymerman, and Kent B Pandolf 23 Mar 1981 25 p refs

(AD-A111075 USARIEM-M-1/81) Avail NTIS HC A02/MF A01 CSCL 06/19

Differentiated ratings of perceived exertion (RPE) were obtained from 8 low-altitude residents during cycle exercise at sea level (SL) and after acute (< 2 hours) and chronic (18 days) exposure to high altitude (4,300m, HA) Mean VO2 max was 27% lower than at SL with acute HA exposure and was not significantly changed with chronic exposure Subjects cycled for 30 min at an exercise intensity requiring 85% of VO2 max Respiratory exchange measurements and differentiated RPE were obtained at the fifth fifteenth, and twenty-fifth min of exercise and pre- and post-exercise blood samples were collected Differentiated RPE included a local muscular rating, a central or cardiopulmonary rating, and an overall rating Despite reduced absolute exercise intensity during acute HA exercise local RPE were unchanged from SL values Chronic HA exercise, however was associated with a significant reduction in local RPE Blood lactate accumulation during SL exercise was not significantly different from acute HA exercise but was significantly less during chronic HA exercise At SL, local ratings were significantly greater than central ratings while neither differed significantly from the overall ratings During acute and chronic HA exercise, none of the differentiated ratings significantly differed, and central RPE were highest of the ratings during chronic HA exercise Ventilatory equivalent for oxygen during HA exercise (both acute and chronic) was significantly higher than at SL GRA

N82-26968# Army Research Inst of Environmental Medicine, Natick Mass Altitude Research Div

CARDIO-RESPIRATORY PHYSICAL TRAINING IN WATER AND ON LAND

Barbara A Avellini Yair Shapiro and Kent B Pandolf 12 Jun 1981 31 p refs

(DA Proj 3E1-62777-A-878)

(AD-A111064 USARIEM-M-13/81) Avail NTIS HC A03/MF A01 CSCL 06/19

Fifteen unconditioned young men who were similar in maximal aerobic power (VO2 max), were divided into three groups (n = 5 each) and physically trained for one month on a bicycle ergometer either on land (I) on immersed to the neck in water of either 32 C (II) or 20 C (III) to determine how physical training (PT) in water differs from training in air PT considered of one-hour daily exercise bouts, 5 times/wk, with exercise intensity readjusted each week to maintain a constant training stimulus of approx 75% VO2 max (determined on land) Throughout the training period, heart rates (HR) of III averaged 20 and 10 beats/min less thn I and II, respectively, despite working at the same VO2 an % VO2 max Following PT plasma volume was not increased over the pretraining values ($p > 0.05$) in any group Hemoglobin concentration and hematocrit significantly increased in all three groups Training elicited a 16% increase in VO2 max in I compared to increases of 13 and 15% for II and III, respectively It was conducted that PT in water produces similar physiological adaptations as does training on land In cold water VO2 max is improved despite training with HR's significantly lower than those on land Author (GRA)

N82-26969# Army Research Inst of Environmental Medicine, Natick, Mass Altitude Research Div

SPARING EFFECT OF CHRONIC HIGH-ALTITUDE EXPOSURE ON MUSCLE GLYCOGEN UTILIZATION DURING EXERCISE

A J Young, W J Evans A Cymerman, K B Pandolf, and J J Knapik 16 Jun 1981 23 p refs

(DA Proj 3E1-61102-BS-10)

(AD-A111063, USARIEM-M-12/81) Avail NTIS HC A02/MF A01 CSCL 06/19

Substrate utilization during heavy (approx 85% VO2 max) bicycle exercise was examined in eight low-altitude residents at sea level (SL) and after acute (2 hours) and chronic (18 days) exposure to 4,300 m (HA) Mean VO2 max was approx 27% lower with acute HA than at SL and did not change significantly with continued HA exposure Biopsies from the vastus lateralis muscle and venous blood samples were obtained before and after 30 min of exercise while determinations of the respiratory exchange ratio (R) were made at 10 min intervals during each of the submaximal bouts Resting serum levels of free fatty acids unchanged with exercise, were 2X and 3X higher than SL with acute and chronic HA, respectively Exercise did not alter resting serum glycerol levels at SL or during acute HA, but caused an 11-fold increase during chronic HA Mean blood lactate concentrations were similar following exercise at SL and acute HA but were 87% lower after chronic HA During exercise at SL and acute HA, the rate of muscle glycogen utilization and R were similar but were 41% and 15% lower respectively, with chronic HA These data suggest that after chronic high-altitude exposure, increased mobilization and use of free fatty acids during exercise resulted in sparing of muscle glycogen Author (GRA)

N82-26970# Army Research Inst of Environmental Medicine Natick Mass Altitude Research Div

MEDICAL AND PERFORMANCE PROBLEMS OF ACUTE HIGH ALTITUDE-EXPOSURE

John T Maher 11 Jul 1981 16 p refs

(DA Proj 3E1-62777-A-879)

(AD-A111062, USARIEM-M-19/81) Avail NTIS HC A02/MF A01 CSCL 06/19

Of the numerous medical problems associated with acute exposure to high terrestrial elevations, the Army's research efforts have focused principally, though not exclusively, on the most common of the disorders, acute mountain sickness (AMS) or soroche This self-limiting syndrome of unacclimatized individuals is characterized by headache, lassitude, insomnia, gastrointestinal symptoms and general malaise which usually become manifest within 4 to 8 hours after arrival, peak between 24 and 48 hours and gradually remit over 4 to 8 days Experience at our Pikes Peak Laboratory (4,300 meters) indicates that approximately 60 percent of the soldiers so exposed experience symptoms severe enough to functionally incapacitate them as efficient combat troops At altitudes higher than 4 300 meters one can expect a disproportionate increase in both the severity of symptoms and the number of individuals in whom they will occur Research efforts at our laboratory to prevent this illness have met with some success, we are now able to reduce symptom intensity at 4 300 meters by 85% through a combination of residence for 4 days at 1,600 meters plus the administration of 500 mg of acetazolamide b i d for the last 2 days at 1,600 meters and the first 2 days at 4,300 meters GRA

N82-26971# Army Research Inst of Environmental Medicine Natick, Mass

AN ERGOMETER FOR CONCENTRIC AND ECCENTRIC MUSCULAR CONTRACTION

Howard G Knuttgen, John F Patton, and James A Vogel 18 Aug 1981 16 p refs Submitted for publication

(AD-A111061 USARIEM-M-20/81) Avail NTIS HC A02/MF A01 CSCL 06/16

An ergometer for human subjects is described which can be used for leg cycling exercise at low to very high intensities involving concentric or eccentric muscle contractions Dependent upon the mode of exercise (concentric or eccentric) and rpm chosen, the upper limit of power production approximates 1,500 W The ergometer permits the study of full ranges of exercise intensities for both types of exercise which, for the concentric condition, includes a high component of anaerobic energy release Author (GRA)

N82-26972# Army Research Inst of Environmental Medicine, Natick, Mass

ISOKINETIC, ISOMETRIC, AND ISOTONIC STRENGTH RELATIONSHIPS

Joseph J Knapik James E Wright Roberta H Mawdsley, and Joanne M Braun 14 Aug 1981 21 p refs Submitted for publication

(AD-A111039, USARIEM-M-18/81) Avail NTIS HC A02/MF A01 CSCL 06/5

The relationships among isokinetic, isometric and isotonic strength measurements in knee and elbow extension and flexion were examined in 16 young, healthy males Isokinetic (36 deg/sec 108 deg/sec, 180 deg/sec) and isometric torque measurements were obtained from a modified Cybex II aparatus An elecrogoniometer was used to monitor the joint angle A modified N-K device was employed to determine maximal isotonic capabilities using a one repetition maximum procedure Correlations among the three testing modes at the joint angles of peak isometric torque were generally high (bar x = 0 78, range = 0 97 to 0 47) for all four muscle groups The amounts of common variance suggested that all three strength testing modes were measuring a similar phenomemon which could be termed maximal voluntary strength Within a particular muscle group correlations decreased both as the isokinetic velocities and as the joint angles became more widely separated Author

N82-26973# Army Research Inst of Environmental Medicine, Natick, Mass Exercise Physiology Div

INFLUENCE OF FIBER TYPE COMPOSITION AND CAPILLARY DENSITY ON ONSET OF BLOOD LACTATE ACCUMULATION

P A Tesch (Karolinska Hospital, Stockholm) D S Sharp, and W L Daniels 25 Mar 1981 20 p refs Submitted for publication

(AD-A111038 USARIEM-M-8/81) Avail NTIS HC A02/MF A01 CSCL 06/16

Onset of blood lactate accumulation (OBLA) was determined in sixteen healthy and physically active men (23-33 yrs) during cycling using a continuous step-wise increased exercise intensity protocol OBLA was defined as the exercise intensity corresponding to a lactate concentration of 4 mmol per liter of blood Oxygen consumption pulmonary ventilation respiratory quotient (R), heart rate and lactate concentration were monitored during each exercise intensity Muscle biopsies were obtained from m-vastus lateralis at rest for determination of fiber type composition and capillary density Calculated values (mean + or - SD) for exercise intensity, oxygen consumption and ventilation at OBLA were 159 (+ or - 37)W, 2 43(+ or 0 47) liters per min and 49 8(+ or - 10 5) liters per min or 65(+ or - 10) percent of V sub O sub 2 max OBLA (percent V sub O 2 max) was found to correlate significantly (r = 0 75 p less than 0 001) to the relative muscle area occupied by ST (Type I) fibers Furthermore 92% of the variance in OBLA could be explained by percent ST area + capillary density It is suggested that both inherent and adaptative qualities of the exercising muscle are of significance for the onset of blood lactate accumulation GRA

N82-26974# Army Research Inst of Environmental Medicine, Natick Mass College of Allied Health Professions

PERCEPTION OF EFFORT DURING ISOMETRIC CONTRACTIONS AS RELATED TO HEART RATE AND BLOOD PRESSURE RESPONSES

Leslie I Goldberg D Joyce White, and Kent B Pandolf (Army Research Inst of Environmental Medicine) 20 May 1981 29 p refs

(DA Proj 3E1-62777-A-878)
(AD-A111033 USARIEM-M-15/81) Avail NTIS HC A03/MF A01 CSCL 06/16

The purpose of this study was to investigate the effects of three intensities of isometric handgrip contractions on selected cardiovascular parameters and perception of effort and to determine the relationship of these cardiovascular parameters to perception of effort GRA

N82-26975# Army Research Inst of Environmental Medicine, Natick, Mass

EFFECTS OF ACUTE PLASMA VOLUME EXPANSION ON ALTERING EXERCISE HEAT PERFORMANCE

Michael N Sawka Roger W Hubbard Ralph Francesconi, and Donald H Horstman 16 Dec 1981 33 p refs

(DA Proj 3E1-61102-BS-10)
(AD-A110558 USARIEM-M-11/82) Avail NTIS HC A03/MF A01 CSCL 06/19

To determine the effect an acute plasma volume expansion has upon exercise performance in the heat seven male volunteers attempted to complete two 90 min walks (40% of VO2 max) in a hot/dry (45 C/20% rh) environment These walks were preceded by an infusion of either human albumin (50 g in a 200 ml solution) or isotonic saline (200 ml) The albumin infusion was found to significantly (P < 0 01) increase plasma volume by about 13% In comparison to preexercise levels plasma volume did not change during the duration of both prolonged walks No significant differences were found for performance time, final heart rate or final rectal temperature values between the two walks In general significant differences were not found for systolic blood pressure rectal temperature mean skin temperature heat storage, sweat rate plasma lactate, plasma osmolality or plasma protein content values between the two walks However, heart rate responses were found to be signficantly lower (P < 0 05 about 13 bpm) during the 25 min and 40 min measurements of the albumin walk These data suggest that plasma volume expansion may be a supportive adaptation to enhance cardiovascular stability but does not improve thermoregulatory function or exercise performance in the heat GRA

N82-26976# Army Research Inst of Environmental Medicine, Natick Mass

EFFECTS ON HEAT TOLERANCE OF PHYSICAL TRAINING IN WATER AND ON LAND

Barbara A Avellini Yair Shapiro S M Fortney and Kent B Pandolf 19 Nov 1981 33 p refs

(DA Proj 3E1-62777-A-878)
(AD-A110556, USARIEM-M-6/82) Avail NTIS HC A03/MF A01 CSCL 06/19

A 4-week training program was undertaken by 15 untrained, unacclimated males who were divided into 3 groups matched on maximal aerobic capacity (VO2 max) and trained either in water or on land to determine how physical training (PT) in these different media affects heat tolerance Subjects trained on a bicycle ergometer for 1 h/day, 5 days/week at 75% VO2 max, with the exercise intensity progressively increased to maintain a constant training stimulus Group I exercised on land, while II and III exercised while immersed to the neck in water of either 32 C (II) or 20 C (III) Daily exercise increased core temperature (Tc) in I and II, but not in III Training elicited similar increases (approx 15%) in VO2 max in the 3 groups Before and after PT, all subjects exercised at approx 30% VO2 max for 3 h at 49 C 20% rh Compared to before training, I and II showed a decrease in final Tc and heart rate (HR) in the post-training heat exposure Seat rate (SR) increased 25% in II, but remained the same in I Group III demonstrated a decrease in final HR but final Tc was higher than before training SR did not increase in III and was lower than the other groups It was concluded that PT can improve the cardiovascular response to dry heat without affecting thermoregulatory capacity PT appears to enhance heat tolerance only if Tc is permitted to rise during exercise thus stimulating the temperature-regulating center for heat dissipation GRA

N82-26977# Army Research Inst of Environmental Medicine Natick, Mass

DOES HEAT ACCLIMATION LOWER THE RATE OF METABOLISM ELICITED BY MUSCULAR EXERCISE

Michael N Sawka, Kent B Pandolf, Barbara A Avellini, and Yair Shapiro 19 Aug 1981 25 p refs

(DA Proj 3E1-62777-A-878)
(AD-A110555 USARIEM-M-5/82) Avail NTIS HC A02/MF A01 CSCL 06/19

Investigations were evaluated to determine if season (summer or winter) of year and subject gender further influence the effect heat acclimation has on metabolism (M) during exercise Volunteers completed standardized treadmill walks in hot (40 C 30% rh or 49 C, 20% rh) and cool (20 C 40% rh) environments immediately before and after heat acclimation After heat acclimation, a lower M was observed in the hot environments and in the cool environment Season of year and subject gender did not have a significant effect on these results These ata indicate that heat acclimation does lower the M elicited by exercise The observed percent decrease was lower in the hot (-3%) than cool (-5%) test environments Physiological mechanisms which could have contributed to this decreased M were an improved muscular efficiency and altered motor unit recruitment patterns TM

N82-26978# Naval Air Development Center, Warminster, Pa Aircraft and Crew Systems Technology Directorate

THE BEGINNINGS OF AEROMEDICAL ACCELERATION RESEARCH Final Report

Harald J VonBeckh 30 Sep 1981 42 p refs

(ZF61412001)

(AD-A111048 NADC-81281-60) Avail NTIS HC A05/MF A01 CSCL 06/19

In the early twenties, when structural strength, maneuverability and power of aircraft had increased sufficiently, grey-out and black-out made their first undesirable appearance during flight Temporary loss of vision was first observed in test flights conducted by the National Advisory Committee for Aeronautics (NACA) with the 'novel' aircraft Fokker PW-7 and also in air races during and/or after the pilots rounded the pylons At first only a small sector of the aeromedical community was attracted to do research into this new field The early contributions of Garsaux (1919), Doolittle (1924), Bauer (1926), Dobrotvorski (1930), Flamme (1931), and von Diringshofen (1932), are reviewed and discussed Several misquotations, partly caused by faulty translations, are clarified It becomes apparent that the exchange of information between the aeromedical investigators, as well as between engineering and aeromedical community, was far from satisfactory This may be the reason that more than one decade passed before the mechanism of visual impairment was understood and the hemostatical theory by von Diringshofen was established experimentally proven and generally accepted Author (GRA)

N82-26979# Sandia Labs, Albuquerque N Mex

MODELS FOR THE ESTIMATION OF INCAPACITATION TIMES FOLLOWING EXPOSURES TO TOXIC GASES OR VAPORS

G J Smith 1981 20 p

(Contract DE-AC04-76DP-00789)

(DE82-000619, SAND-81-2197C) Avail NTIS HC A02/MF A01

Based on the various physiological and toxicological effects that can occur, a set of four models was developed to predict the time to incapacitation from exposure to toxic gases The four models encompass the range of effects which can lead to immediate incapacitation These models use historical accident data from incapacitating human exposures or experimentally determined incapacitation data for animals An alternate model was developed for use when direct incapacitation data are not available The time to incapacitation is predicted using mortality dose data for animals DOE

N82-26980# Bureau of Radiological Health, Rockville, Md

EMISSION COMPUTED TOMOGRAPHY: THE SINGLE PHOTON APPROACH

Peter Paras and Edward A Eikman Aug 1981 322 p refs Symp held at Washington D C, 9-12 Mar 1980

(PB82-131285, FDA/BRH-81/112) Avail NTIS HC A14/MF A01 CSCL 06L

Single photon emission computed tomography (SPECT) was discussed Information on current SPECT techniques are outlined Current views on different types and clinical applications of SPECT are presented GRA

N82-26981# Logicon, Inc, San Diego, Calif Tactical and Training Systems Div

OBJECTIVES HIERARCHY FOR AIR INTERCEPT CONTROLLER PROTOTYPE TRAINING SYSTEM Final Report, 28 Sep 1978 - 28 Jun. 1981

Robin Halley, J Thel Hooks, Jr, Harry G Lankford, and Larry H Nowell Dec 1981 212 p refs

(Contract N61339-78-C-0182)

(AD-A110847, Rept-8641-A005) Avail NTIS HC A10/MF A01 CSCL 05/9

This is the second report of a series describing the design implementation and tests of the use of computer speech recognition technology in the tactical training area The technical issues in psychology, training, and speech recognition will require a highly complex integration effort in order to be successful This report provides the details required in order to develop a syllabus Objectives are arranged in hierarchies to depict their interrelationships An alternate numbers table indicates objectives required on more than one higher level objective It will be the task of the syllabus development effort to teach these objectives in a sequence which provides training cost effectiveness and efficient skill acquisition More tasks are included here than are taught now, but none of these tasks are irrelevant to the AIC The prototype system developed from these objectives will serve as a test vehicle for incorporation of advanced technologies into the specifications of follow-on trainers Fleet personnel will play a major role in the design and evaluation of the prototype, and thereby play a major role in the selection of the advanced technologies The training enhancements evolving from this process will maintain the Navy's image as a leader in training systems GRA

N82-26982# Bolt, Beranek, and Newman, Inc, Cambridge, Mass

PROJECT STEAMER. 6. ADVANCED COMPUTER-AIDED INSTRUCTION IN PROPULSION ENGINEERING Interim Report, Mar 1980 - Feb. 1981

Albert Stevens, Bruce Roberts, Larry Stead, Kenneth Forbus, Cindy Steinberg, and Brian Smith Jan 1982 27 p refs

(Contract N00123-81-D-0794)

(AD-A110797 NPRDC-TR-82-28) Avail NTIS HC A03/MF A01 CSCL 05/9

At present, propulsion engineering training is a major problem for the Navy NAVPERSRANDCEN's goal is to build an intelligent computer-aided instruction (ICAI) training system to enhance Navy training in this area and evaluate the potential of new computer-based technology to provide a qualitatively different form of training The STEAMER project is concerned with the design and implementation of a training system to instruct personnel in the principles of propulsion engineering Operational personnel need to understand these principles of plant operation in order to remember the multitude of procedures required for safe plant operation and to be able to respond to a myriad of potential casualty conditions GRA

N82-26983# Air Force Human Resources Lab, Brooks AFB, Tex Manpower and Personnel Div

APTITUDE REQUIREMENTS BASED ON TASK DIFFICULTY: METHODOLOGY FOR EVALUATION Interim Report, 1975 - 1980

Lloyd D Burtch, M Suzanne Lipscomb, and Dale J Wissman Jan 1982 38 p refs

(AF Proj 7719)

(AD-A110568, AFHRL-TR-81-34) Avail NTIS HC A03/MF A01 CSCL 05/9

The development and application of a technology designed for the evaluation of the difficulty of Air Force jobs in conjunction with the aptitude level required for the job is described The technology developed makes use of computed variables and task factor data collected by the Air Force Occupational Measurement Center as well as benchmark difficulty data collected by contract personnel experts for the specialties under study The application of this technology provides a unique method of determining and comparing the learning difficulty of Air Force tasks and jobs, both within and across career specialties Analyses have indicated high interrater reliabilities for both supervisory and benchmark ratings A two-variable multiple regression equation was developed for each of the specialties studied Relatively high correlations were obtained between the two ratings indicating that independent raters tend to agree with supervisors These questions resulted in estimates of average task difficulty per unit time (ATDPUT) values for each job in each specialty The value of these estimates and implications for their use are discussed Author (GRA)

N82-26984# Bolt, Beranek, and Newman Inc, Cambridge, Mass

EFFECTS OF WHOLE-BODY MOTION SIMULATION ON FLIGHT SKILL DEVELOPMENT Final Report, 1 Jun. 1978 - 30 Sep 1981

William H Levison Oct 1981 149 p refs

(Contract F49620-78-C-0073, AF Proj 2313)

(AD-A111115, BBN-4645, AFOSR-82-0066TR) Avail NTIS HC A07/MF A01 CSCL 05/9

Progress was made toward the development of models for piloting skill acquisition The following tasks were accomplished, (1) design of an experiment to study visual and motion cue integration in a multi-axis control tasks, (2) enhancement of the optimal control pilot model, (3) further development of a scheme for automatic identification and significance testing of 'pilot-rated' model parameters (4) analysis of control strategy development, (5) study of the relationship between task structure and pilot response limitations, (6) test of a multiplicative motor noise model, and (7) a brief literature search on adaptive control and identification algorithms for potential application to models for control-strategy development Author (GRA)

N82-26985# Massachusetts Univ, Amherst Lab of Psychometric and Evaluative Research

LATENT TRAIT MODEL CONTRIBUTIONS TO CRITERION-REFERENCED TESTING TECHNOLOGY Final Report

Ronald K Hambleton Brooks AFB, Tex AFHRL Feb 1982

31 p refs
(Contract F33615-79-C-0020, AF Proj 2313)
(AD-A112048, AFHRL-TP-81-33) Avail NTIS HC A03/MF A01 CSCL 05/10

The goals and results of an 18-month study addressing latent trait model applications to measurement problems arising in criterion-referenced testing are presented The research studies described in the report cover the following areas (a) problems with classical test models, introduction to latent trait models, features, assumptions, parameter estimation, and test and item information curves, building tests with latent trait models, (b) latent ability scales - uses, interpretations, and properties, equating test scores for using a common set of norms tables, approaches for addressing the goodness of fit between a latent trait model and a data set, (c) comparing the one-parameter and three-parameter logistic models for ability estimation and decision-making with several test lengths and ability levels, (d) determining the optimal length of criterion-referenced tests with different types of item pools (varying the level of item heterogeneity) and using two different item selection methods, (e) a system to allow instructors to specify required level of measurement precision and obtain information to help them determine test length, (f) comparing the fit of the one-parameter and three-parameter models to 25 sets of test data, and (g) building banks of valid test items Author (GRA)

N82-26986# Missouri Univ, Columbia Tailored Testing Research Lab
THE FORMATION OF HOMOGENEOUS ITEM SETS WHEN GUESSING IS A FACTOR IN ITEM RESPONSES
Mark D Reckase Aug 1981 94 p refs
(Contract N00014-77-C-0009, NR Proj 150-395 RR0420401)
(AD-A107134, RR-81-5) Avail NTIS HC A05/MF A01 CSCL 12/1

One of the major assumptions of latent trait theory is that the items in a test measure a single dimension This report describes an investigation of procedures for forming a set of items that meet this assumption Factor analysis, nonmetric multidimensional scaling cluster analysis and latent trait analysis were applied to simulated and real test data to determine which technique could best form an unidimensional set of items Theoretical and empirical evaluations were also made of the effects of guessing on the dimensionality of test data The results indicated that guessing affected highly discriminating items more so than poorly discriminating items However, the effect of guessing on the dimensionality of tests with common distributions of difficulty and discrimination indices was found to be minimal Of the procedures evaluated for sorting items into unidimensional item sets, principal factor analysis of phi coefficients gave the best results overall Nonmetric multidimensional scaling also showed promise when used with Yule's Y, phi, or tetrachoric similarity coefficients, but it did not perform as well as the factor analytic techniques on the real test data In summary, guessing does have an effect on test data, but the effect is not very large unless items of extreme difficulty are present in the test Of the procedures evaluated, traditional factor analytic techniques gave the most useful information for sorting test items into homogeneous sets Author (GRA)

N82-26987* National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif
PRESSURE SUIT JOINT ANALYZER Patent
Hubert C Vykukal and Bruce W Webbon, inventors (to NASA) Issued 19 Jan 1982 7 p Filed 11 Jul 1980 Supersedes N80-30042 (18 - 20, 2756)
(NASA-Case-ARC-11314-1, US-Patent-4,311,055, US-Patent-Appl-SN-168943 US-Patent-Class-73-862 08) Avail US Patent and Trademark Office CSCL 06K

A measurement system for simultaneously measuring torque and angular flexure in a pressure suit joint is described One end of a joint under test is held rigid A torque transducer is pivotably supported on the other movable end of a joint A potentiometer is attached to the transducer by an arm The wiper shaft of the potentiometer is gripped by a reference arm that rotates the wiper shaft the same angle as the flexure of joint A signal is generated by the potentiometer which is representative of the joint flexure A compensation circuit converts the output of the transducer to a signal representative of joint torque Official Gazette of the U S Patent and Trademark Office

N82-26988*# George Washington Univ Medical Center, Washington, D C
INSECTS. A NUTRITIONAL ALTERNATIVE
Patricia A Dufour 1981 68 p refs
(Contract NASw-3165)
(NASA-CR-169056, NAS 1 26 169056) Avail NTIS HC A05/MF A01 CSCL 06H

Insects are considered as potential food sources in space Types of insects consumed are discussed Hazards of insect ingestion are considered Insect reproduction, requirements and raw materials conversion are discussed Nutrition properties and composition of insects are considered Preparation of insects as human food is discussed N W

N82-26989# Naval Coastal Systems Center Panama City Fla Life Support Systems Div
CARBON DIOXIDE ABSORPTION CHARACTERISTICS OF HIGH PERFORMANCE SODASORB AT 1 ATMOSPHERE Technical Memo, FY 1980-1981
A Purer, G A Deason, M I Nuckols and J F Wattenbarger Oct 1981 22 p
(AD-A107488 AD-F200014, NCSC-TM-327-81) Avail NTIS HC A02/MF A01 CSCL 06/11

Standardized methods have been developed to evaluate the efficiency of different carbon dioxide absorbents Effects of moisture, absorbent cell dimensions, linear velocity and temperature have been included in this investigation The use of such standardized procedures will allow data comparisons which have not been possible The engineering data should also be directly applicable to future canister design GRA

N82-26990# Electro-Voice Inc, Buchanan, Mich
ADVANCED DESIGN LINEAR NOISE-ATTENUATING EARPHONE-EARCUP SYSTEM Final Report, Jun. 1980 - Jul 1981
Robert B Jackson Aug 1981 42 p refs
(Contract DAAK80-80-C-0556)
(AD-A110820, CECOM-80-0556F) Avail NTIS HC A03/MF A01 CSCL 06/17

This document covers the development of a headset designed to improve intelligibility and reduce ear fatigue of combat vehicle crewmen in armored vehicles It is electrically equivalent to the Mk-1697/G kit, but is self supporting and is not designed to fit any particular helmet Author (GRA)

N82-26991# Northrop Corp, Hawthorne, Calif Aircraft Div
CREW WORKLOAD PREDICTION STUDY Final Report, 1 Jul 1980 - 15 Dec 1981
J F Watler, Jr, D W Rowell, S S Janoski and Larry C Butterbaugh (AFWAL) Wright-Patterson AFB, Ohio AFWAL Dec 1981 109 p refs
(Contract F336615-80-C-3618 AF Proj 2403)
(AD-A111948, AFWAL-TR-81-3140) Avail NTIS HC A06/MF A01 CSCL 01/3

This report documents a study which applied an analytic method known as the Controls and Display Evaluation Model, or CODEM, to the flight deck avionics improvements identified in the Flight Control Division s (AFWAL/FIGR) Tanker Avionics and Aircrew Complement Evaluation (TAACE) program TAACE, in support of the USAF KC-135 Avionics Modernization Program, sought to establish design criteria for the controls and displays of improved avionics, in the event the crew of the KC-135 is reduced by eliminating the navigator The objective of this study was to apply CODEM to a previously evaluated design, so that the resulting data could be used to evaluate the validity of CODEM by comparing the two sets of data CODEM, which is still in the developmental stage, embodies a 'limit design' approach to the problem of controls and displays engineering and integration Absolute design limits and progressive tests are used to test the emerging design in terms of task complexity CODEM output consists of plots of task complexity vs time and a printout of associated equipment-related tasks which allows the designer to diagnose the source of any undersirable crew loading CODEM s application to the TAACE flight deck design concluded that the air-refueling mission could be performed without excessive workload on the crew GRA

N82-26992# Army Research Inst of Environmental Medicine Natick, Mass
ANATOMIC PERSPECTIVE OF THE FEMALE ATHLETE· AN APPROACH TO MUSCULOSKELETAL PROFILING OF

WOMEN IN SPORTS
Connie Bauman (Wellesley Coll), Joseph J Knapik, Bruce H Jones John M Harris (Veterans Administration Hospital, Boston), and Linda K Vaughn 11 Jan 1982 22 p refs
(AD-A110630, USARIEM-M-8/82) Avail NTIS HC A02/MF A01 CSCL 06/5

Women s sports did not begin to grow and gain public recognition until the early 1970's Since then, the number of women participating in intercollegiate sports has doubled and the number of girls participating in interscholastic sports programs has increased almost threefold As women flood the sports arena, many questions arise regarding the female athlete Their performance capabilities are constantly compared with male athletic records and standards, and explanations for the difference in their level of performance are being sought GRA

N82-26993# Army Aeromedical Research Lab , Fort Rucker, Ala Visual Science Group
DIRECT AND NEIGHBORING SENSITIVITY CHANGES PRODUCED BY RED AND BLUE-WHITE ADAPTING FIELDS
Franklin F Holly and Virgil R Rogers Feb 1982 24 p refs Presented at the Tri-Service Aeromed Res Panel Pensacola, Fla , 12-13 Dec 1979
(DA Proj 3M1-61102-BS-10)
(AD-A111880 USAARL-82-1) Avail NTIS HC A02/MF A01 CSCL 01/3

Observers viewed Army instrument panel lighting red and Air Force instrument panel lighting blue-white adaptation fields and their thresholds were determined both within the adaptation field and outside of it In some cases, thresholds were determined while the adaptation field was still on and in other cases they were determined after the adaptation field had been off for 10 seconds GRA

N82-26994# Army Research Inst of Environmental Medicine, Natick, Mass
EFFECTIVENESS OF FIVE WATER-COOLED UNDERGARMENTS IN REDUCING HEAT STRESS OF VEHICLE OPERATING IN A HOT WET OR HOT DRY ENVIRONMENT
George F Fonseca Mar 1981 50 p refs
(DA Proj 3E1-62777-A-878)
(AD-A107105, USARIEM-T-2/81) Avail NTIS HC A03/MF A01 CSCL 06/17

The auxiliary cooling provided by five water cooled undergarments was directly measured on a life size sectional manikin Each water cooled undergarment was worn with a combat vehicle crewman ensemble, with or without a complete chemical protective suit Cooling rates (watts) were determined for both dry (nonsweating) and completely wet (maximal sweating) skin conditions The watts of heat removed from either the dry of the completely wet skin surface were almost directly proportional to the temperature difference between the manikin skin temperature and the cooling water inlet temperature the cooling represents the absorption of heat directly from the body, plus any heat that is received by the body from a hot environment The cooling density, expressed in watts of cooling per square meter of cooling tube array differed with the size of the array and with the location of the skin surface it covered GRA

N82-26995*# National Aeronautics and Space Administration Washington D C
PUBLICATIONS OF THE EXOBIOLOGY PROGRAM FOR 1981 A SPECIAL BIBLIOGRAPHY
Linda G Pleasant, comp (George Washington Univ) and Donald L DeVincenzi, comp Jun 1982 35 p
(NASA-TM-84895 NAS 1 15 85895) Avail NTIS HC A03/MF A01 CSCL 06C

The exobiology program investigates the planetary events which were responsible for, or related to the origin, evolution, and distribution of life in the universe The areas involved include chemical evolution organic geochemistry, origin and evolution of life, planetary environments life in the universe, planetary protection and Mars data analysis S L

N82-27962*# Department of Agriculture, College Station, Calif Pest Control Equipment and Methods Research Unit
PREDICTING THE TIMING AND POTENTIAL OF THE SPRING EMERGENCE OF OVERWINTERED POPULATIONS OF HELIOTHIS spp Final Report, 1 Oct. 1980 - 31 Mar. 1981
Albert W Hartstack, John A Witz, and Juan D Lopez 31 Mar 1981 36 p refs
(NASA Order T-4629H)
(NASA-CR-167444, NAS 1 26 167444) Avail NTIS HC A03/MF A01 CSCL 06C

Current literature was reviewed in detail Temperature and day length are the primary factors which program H spp larva for possible diapause Mortality during diapause is reported as highly variable The factors causing mortality are identified Sufficient data was collected to allow the development of mathematical models which predict the timing of emergence Timing predictions compare favorably to observed field data, however prediction of actual numbers of emerging moths was not possible The potential for use of spring emergence predictions in pest management applications, as an early warning of potential crop damage, are excellent Research requirements to develop such an early warning system are discussed T M

N82-27963*# National Aeronautics and Space Administration, Washington, D C
THE EVALUATION OF STUDIES OF FLIGHT PERSONNEL OF THE GERMAN LUFTHANSA ON THE QUESTION OF STRESS DURING FLIGHTS ON THE SHORT EUROPEAN ROUTES
K E Klein, H Bruener P Kuklinski, S Ruff, and H M Wegmann Feb 1982 39 p refs Transl into ENGLISH from German report Rept-DLR-355-74/2 DFVLR Oberpfaffenhofen, West Germany, 1972 34 p Original language document announced as N77-80915 Transl by Kanner (Leo) Associates, Redwood City, Calif
(Contract NASw-3541)
(NASA-TM-76660, NAS 1 15 76660) Avail NTIS HC A03/MF A01 CSCL 06S

Medical studies were undertaken on the stress experience by the cockpit crew working the short routes in Europe and a special attempt was made to discover whether signs of a summation of stress due to flight work become visible during a circuit of several days For this purpose the pulse and respiratory rates were determined for 22 crew members as an indication of the acute stress occurring during the flight and the amount of stress hormone in the urine as an indication of the extent of total stress in an extended study period Author

N82-27964*# Tennessee Univ , Memphis Materials Science Toxicology Labs
TOXICITY OF THERMAL DEGRADATION PRODUCTS OF SPACECRAFT MATERIALS Final Report, 10 Nov 1980 - 9 May 1982
W H Lawrence, J E Turner, Caroline Sanford Sam Foster, Eula Baldwin, and Jacqueline OConnor 7 May 1982 138 p refs
(Contract NAS9-15670)
(NASA-CR-167615, NAS 1 26 167615) Avail NTIS HC A07/MF A01 CSCL 06T

Three polymeric materials were evaluated for relative toxicity of their pyrolysis products to rats by inhalation Y-7683 (LS 200), Y-7684 (Vonar 3 on Fiberglass), and Y-7685 (Vonar 3 on N W Polyester) Criteria employed for assessing relative toxicity were (1) lethality from in-chamber pyrolysis, (2) lethality from an outside-of-chamber pyrolysis MSTL Procedure, and (3) disruption of trained rats shock-avoidance performance during sub-lethal exposures to in-chamber pyrolysis of the materials Author

N82-27965# Beth Israel Hospital Boston Mass Orthopedic Biomechanics Lab
FRACTURE AND VISCOELASTIC CHARACTERISTICS OF THE HUMAN CERVICAL SPINE KINEMATICS OF THE 3 ACTUATOR SYSTEM
W C Hayes, A A White, W T Edwards, and J Lelli Aug 1981 135 p refs
(Contract F49620-81-K-0010, AF Proj 2312)
(AD-A110980, AFOSR-82-0041TR) Avail NTIS HC A07/MF A01 CSCL 06/19

An analysis of the actuator kinematics and the load generation capabilities was performed The kinematic behavior of the Planar Motion Material Testing (PMMTA) actuators was analyzed using a computational algorithm written for a MINC-11-03 computer and a TK4010 plotting terminal The analysis addressed (1) the range of motion of the test stage considering various angular

orientations of the test stage for the most acceptable design, and (2) the calculation of max loads in the vertical, horizontal and rotational directions for each position of the test stage
Author

N82-27966# Army Aeromedical Research Lab., Fort Rucker, Ala
PREVALENCE OF ASTIGMATISM AMONG AVIATORS AND ITS LIMITING EFFECT UPON VISUAL PERFORMANCE WITH THE AN/PVS-5 FLIGHT VISION GOGGLES
Hanson J Kim 2 Mar 1982 7 p
(AD-A112836) Avail NTIS HC A02/MF A01 CSCL 06/5

Emphasis on sustained operations during periods of darkness is steadily increasing Presently, the AN/PVS-5 Night Vision Goggles (NVG) are utilized for night operations The primary concern with these goggles is the astigmatism criterion since this, unlike spherical refractive errors is not compensated by the NVG The NVG have only an adjustable range of +2 00 to -6 00 diopters to correct for spherical error No provisions were incorporated into the design of the NVG to allow correction of astigmatic error Consequently, an aviator with a significant amount of astigmatism will have reduced visual acuity which will affect *his operational performance A study was undertaken to identify* the number of rated aviators at the Army Aviation Center with detected astigmatism in order to assess the magnitude of this *particular problem and to determine whether or not the current* standards for astigmatism are sufficient for the aviators who are using the AN/PVS-5 Night Vision Goggles GRA

N82-27967# Rutgers - The State Univ., New Brunswick, N J Dept of Psychology
EYE MOVEMENTS AND VISUAL INFORMATION PROCESSING Final Report
Eileen Kowler 16 Dec 1981 12 p refs
(Contract F49620-81-K-0008 AF Proj 2313)
(AD-A112399 AFOSR-82-0137TR) Avail NTIS
HC A02/MF A01 CSCL 06/16

Eye movements determine the location and velocity of the retinal image Thus to understand how we see it is necessary to understand both how eye movements are controlled and how they affect visual information processing The proposed research is concerned with both problems, specifically (1) the effect of expectations on smooth eye movements, (2) the effect of saccades and saccade-like stimulus perturbations on visual information processing, and (3) programming sequences of saccades GRA

N82-27968# Utah State Univ., Logan Dept of Biology
AN EVALUATION OF LOCALIZED SWEATING RATES FOR PREDICTING TOTAL BODY SWEATING RATES Final Scientific Report
James A Gessaman Dec 1981 31 p refs
(Grant AF-AFOSR-0276-80, AF Proj 2312)
(AD-A111902, AFOSR-82-0109TR) Avail NTIS
HC A03/MF A01 CSCL 06/19

This project accessed the accuracy of estimating whole body sweating rates (WBSR) from local sweating rates (LSR) measured *with sweat collection capsules containing filter paper* Sweat was collected in capsules strapped on five locations of the body (1) midforehead, (2) superiorflexor side of the right forearm, (3) *left pectoralis major*, (4) *medial midsection of the left thigh*, and (5) upper medial side of the left calf Sweating rates of 10 male subjects were measured while they rested at an air temperature of 39 4 C and 58 4% RH, and while they ran on a treadmill at a work output of 60% VO2 max with an air temperature of 35 5 C and 33 2% RH Among all subjects the WBSR averaged 4 3147 g/min sq m during rest and 7 6062 g/min sq m during exercise The LSR from any one of the five locations was a poor predictor of WBSR Multiple regression equations which included LSRs from all five locations gave an r squared > 90 for 5 subjects during rest and exercise The multiple regression equations derived from the data combined from all subjects was not as good a predictor of WBSR as some of the equations derived for individual subjects, i e , r squared = 70 3 for data during rest and r squared = 46 1 for data during exercise Four equations which weighted the LSRs with the corresponding skin area factors provide a poor estimate of WBSR (r squared = 53 9) Author (GRA)

N82-27969# Ohio State Univ., Columbus Dept of Engineering Mechanics
LONG BONE AND JOINT RESPONSE TO MECHANICAL LOADING Final Report, 1 Apr. 1979 - 30 Sep. 1981
Ali Erkan Engin Nov 1981 165 p refs
(Contract F49620-79-C-0110, AF Proj 2312)
(AD-A111551, AFOSR-82-0013TR) Avail NTIS
HC A08/MF A01 CSCL 06/16

The research program presented in this report is concerned with collection of active muscle force and moment response data of the human upper and lower extremities when the extremities are subjected to various external forces The major components of the specially designed and built experimental apparatus are a subject restraint system, a force application device which employs three sonic emitters, and an upper arm (or upper leg) cuff with four sonic emitters The sonic emitters *are utilized to determine the three dimensional direction and* the location of the force application on the limbs and the orientation of the limbs with respect to the torso Kinematics of *relative motion between two body segments* is presented in a format suitable for utilization of four sonic emitters on the moving body segment The numerical results are presented from a set of experiments conducted on three male and three female subjects to determine their active muscle resistance against the external forces to dislodge their limbs from the initial or so-called stowed position It is concluded that although there are intra- and inter-subject variations for the maximum values of the resistive muscle force and moment data for the limbs there are some trends one can establish for the behavior of their magnitudes
GRA

N82-27970# Office of Naval Research London (England)
THE BIOLOGICAL EFFECTS OF NONIONIZING RADIATION
J B Bateman 29 Dec 1981 23 p refs Presented at the 10th L H Grey Memorial Conf., Oxford, 13-16 Jul 1981
(AD-A111898, ONRL-C-12-81) Avail NTIS
HC A02/MF A01 CSCL 06/18

This is a critical report on the L H Grey Memorial Conference held in Oxford 13-16 July 1981 The Conference was entitled 'Biological Action of Radiofrequency Microwave and Ultrasonic *Radiations' The report provides a background identifying the* field of interest in broader terms, intended for the general reader It is then pointed out that the conference was mainly directed toward research and practice related to the possible value of nonionizing radiations in cancer therapy There were, however tutorial lectures of a fairly general character and some discussion of biological effects not necessarily arising from production of heat in irradiated tissues Author (GRA)

N82-27971# Air Force Inst of Tech Wright-Patterson AFB, Ohio School of Engineering
FINITE ELEMENT ANALYSIS OF THE VISCO-ELASTIC INTERACTION OF THE ANNULUS FIBROSIS AND NUCLEUS PULPOSIS WITHIN THE HUMAN INTERVERTEGRAL JOINT M S. Thesis
Leslie J Allen Dec 1981 96 p refs
(AD-A111161 AFIT/GAE/AA/81D-1) Avail NTIS
HC A05/MF A01 CSCL 06/16

An understanding of the mechanical properties and behavior of the intervertebral disc is critical to several current areas of research Among these are the study of the effects of extreme gravitational forces on the air crews of high performance aircraft and the related problem of spinal injuries due to aircraft ejection This study was undertaken in order to construct a realistic analytical model of the intervertebral joint using the finite element *approach Experiments have shown that healthy intervertebral* joints exhibit creep when subjected to axial load The focus of this investigation is the behavior and interaction of the nucleus and annulus under loading An axisymmetric finite element model is employed which incorporates a linear visco-elastic constitutive relation for the annulus and nucleus, based upon a three-parameter Kelvin solid The visco-elastic constants are found by matching one-dimensional axial experimental data with this two dimensional model The nucleus, which is composed of a series of concentric lamellae of collagen fibers has been modelled as a 12ply structure of orthotropic material GRA

N82-27972# Advisory Group for Aerospace Research and Development Neuilly-Sur-Seine (France)
SLEEP AND WAKEFULNESS HANDBOOK FOR FLIGHT MEDICAL OFFICERS
A N Nicholson (Inst of Aviation Medicine, Farnborough England) and Barbara M Stone (Inst of Aviation Medicine Farnborough, England) Mar 1982 89 p

(AGARD-AG-270(E) ISBN-92-835-1416-5) Avail NTIS HC A05/MF A01

Sleep and wakefulness related to aircrew and the aviation environment are discussed Eight topics are covered alertness and sleep sleep,'Circadian rhythms, shiftwork, transmeridian flight, air operations and irregularity of work, disorders of sleep and arousal, and hypnotics NW

N82-27973# Intermagnetics General Corp Guilderland, N Y
FEASIBILITY STUDY NMR IMAGING MICROSCOPE Final Report, 1 Sep 1980 - 28 Feb 1981
W V House 24 Apr 1981 114 p refs
(Grant NSF DAR-80-09739)
(PB82-125915 NSF/PCM-81006) Avail NTIS HC A06/MF A01 CSCL 06B

The influences of probe geometry were analyzed and quantified for the very small dimensions and high magnetic fields required to examine individual cells and to explore the fundamental differences between normal and abnormal cells for both research and diagnostics The possibility of sharpening the resonance frequency and improving resolution by simulating the nuclei with appropriate time dependent radio frequency pulses were studied Analysis shows that the theoretically obtainable resolution in an NMF microscope is limited by Brownian motion of the resonating nuclei along the field gradient that defines surfaces of constant magnetic field To opitimize resolution, it is necessary to shorten the time duration during which the gradient is applied Consideration of signal to noise characteristics shows that the best practically obtainable resolution is about 2 pi times greater than the theoretical limit GRA

N82-27974# South Carolina Univ Columbia Dept of Epidemiology and Biostatistics
EPIDEMIOLOGY FEASIBILITY STUDY· EFFECTS OF NOISE ON THE CARDIOVASCULAR SYSTEM Final Report
Shirley J ThompsonSep 1981 199 p refs
(Contract EPA-6801-6274)
(PB82-147752, EPA-550/9-81-103) Avail NTIS HC A09/MF A01 CSCL 06S

World literature to date and a critical analysis of existing foreign and domestic epidemiological research on the nonauditory physiological effects of noise are reviewed Literature on hypertension, cardiovascular disease, and general stress are analyzed for its applicability to noise effects epidemiology Information and recommendations pertinent to substantive and methodological issues related to the design and conduct of future noise effects epidemiology is also provided GRA

N82-27975# South Carolina Univ , Columbia
EPIDEMIOLOGY FEASIBILITY STUDY EFFECTS OF NOISE ON THE CARDIOVASCULAR SYSTEM. APPENDIX B. ANNOTATED BIBLIOGRAPHY. LITERATURE. THE EFFECTS OF NOISE ON THE CARDIOVASCULAR SYSTEM
Shirley J Thompson Jul 1981 248 p
(Contract EPA-68-01-6274)
(PB82-147760, EPA-550/9-81-103B) Avail NTIS HC A11/MF A01 CSCL 06S

A bibliography of the world literature on the epidemiologic studies of the effect of noise on the cardiovascular system in man is presented The assignment of numerical scores and ratings are discussed in the narrative report accompanying this bibliography The assessment criteria employed, the assessment forms devised for standardization of the critiques and summarizations of the evaluations are included GRA

N82-27976# South Carolina Univ , Columbia
EPIDEMIOLOGY FEASIBILITY STUDY. EFFECTS OF NOISE ON THE CARDIOVASCULAR SYSTEM APPENDIX C· REVIEW OF NON-NOISE RELATED RESEARCH OF CARDIOVASCULAR DISEASE
Julian E Keil, David M Propert, and Shirley J Thompson Jul 1981 103 p refs
(Contract EPA-68-01-6274)
(PB82-147778, EPA-550/9-81-103C) Avail NTIS HC A06/MF A01 CSCL 06S

Information about the pathology, pathogenesis, and epidemiology of cardiovascular diseases is reviewed The key cardiovascular diseases, their manifestations, risk factors, etiology of the risk factors and origin of the precipitants of the diseases are discussed An empirical foundation for subsequent noise related research is provided (1) current knowledge of the pathogenesis and pathophysiology of the cardiovascular diseases (2) key confounding and interactive factors to be considered in the design of future studies, and (3) pathways in the pathogenic process and potential entry points for investigation of noise as the environmental influence on the cardiovascular system are included GRA

N82-27977# Navy Personnel Research and Development Center San Diego, Calif
PERFORMANCE TEST OBJECTIVITY A COMPARISON OF RATER ACCURACY AND RELIABILITY USING THREE OBSERVATION FORMS Technical Report, Dec. 1979 - Apr 1980
William A Nugent, Gerald J Laabs and Robert C Panell Feb 1982 31 p refs
(ZF63522001)
(AD-A111077, NPRDC-TR-82-30) Avail NTIS HC A03/MF A01 CSCL 05/9

The study examined two variables that may influence the consistency and accuracy of rater's judgments in evaluating job performance (1) the precision with which behaviors to be observed and evaluated are specified on a performance observation form, and (2) the level of proficiency of the rater at the task being evaluated Videotapes were prepared that depicted both passing and failing performances in the use of two types of electronic test equipments The videotapes were observed in two experiments by raters who used a structured, semistructured, or unstructured performance observation form Rater skill level was determined by the score the rater obtained on a performance test that consisted of the same types of electrical measurement problems as shown on the videotape For both experiments, the presence of at least some structure in a performance observation form produced more accurate and reliable evaluations of job task performance than did a form with no structure Within the range of rater skill tested, results showed that the level of skill proficiency that raters have with a particular type of electronic test equipment is largely independent of their ability to judge accurately and consistently the performance of others in using the same equipment Author (GRA)

N82-27978# Dunlap and Associates, Inc , La Jolla, Calif
TRAINING IMPROVEMENTS FOR THE TACTICAL AIRCREW TRAINING SYSTEM (TACTS) PROJECT SUMMARY REPORT Final Report, Aug. 1978 - Aug. 1980
A P Ciavarelli, A M Williams, and G R Stoffer Orlando, Fla Naval Training Equipment Center Sep 1981 47 p refs
(Contract N61339-78-C-0136)
(AD-A107003 NAVTRAEQUIPC-78-C-0136-3) Avail NTIS HC A03/MF A01 CSCL 05/9

This report presents summarized information related to the Tactical Aircrew Combat Training System (TACTS) training improvements program The two major sections of the report area addressed to (1) a description of a computer based TACTS debrief system referred to as the Performance Assessment and Appraisal System (PAAS), and (2) a problem definition study of air intercept missile (AIM) envelope recognition training The preliminary design of a computer based system has been completed and a single design module, Performance Assessment and Combat Effectiveness (PACE), is ready for operational test and evaluation Summarized information from a more comprehensive study of U S Navy air-to-air missile envelope training problems is included Recommendations for improving fleet envelope recognition training are reviewed Author (GRA)

N82-27979# Naval Postgraduate School, Monterey, Calif Dept of Operations Research
EFFECT OF TASK DURATION ON VOICE RECOGNITION SYSTEM PERFORMANCE
John W Armstrong and Gary K Poock Sep 1981 71 p refs
(AD-A107442, NPS55-81-017) Avail NTIS HC A04/MF A01 CSCL 05/8

This report describes an experiment examining voice recognition performance when subjects were required to make a decision every 1 5 seconds for 20 consecutive minutes while speaking to a voice recognizer at the same time Results showed mental loading degraded voice recognition performance Results also showed performance degradation similar to a vigilance decrement over eight trials of 2 5 minutes each Author (GRA)

N82-27980# Naval Postgraduate School, Monterey, Calif
EFFECT OF OPERATOR MENTAL LOADING ON VOICE

RECOGNITION SYSTEM PERFORMANCE
Gary K Poock and J W Armstrong Aug 1981 60 p refs (Contract N00039-80WR-09041)
(AD-A107477 NPS55-81-016) Avail NTIS HC A04/MF A01 CSCL 05/8

This report describes an experiment in which military officers used voice recognition under various mental loading conditions Results showed voice recognition performance degraded as mental loading was imposed on the subjects Author (GRA)

N82-27981# Pittsburg Univ , Pa Learning Research and Development Center
EMPIRICAL STUDIES OF PROCEDURAL FLAWS, IMPASSES, AND REPAIRS IN PROCEDURAL SKILLS
Kurt VanLehn 5 Feb 1982 75 p refs Prepared in cooperation with Xerox Palo Alto Research Center
(Contract N00014-79-C-0215, RR042060A, NR Proj 667-430)
(AD-A113791 TR-ONR-8) Avail NTIS HC A04/MF A01 CSCL 05/9

This report represents the results of several extensive empirical studies A group of 925 students who were in the process of learning subtraction were tested using highly diagnostic tests developed by DEBUGGY Some students were retested two days later to measure the short-term stability of bugs, and others were retested several months later to study long-term stability All tests were analyzed by DEBUGGY and by several expert diagnosticians in order to assess DEBUGGY'S diagnostic abilities It was found that DEBUGGY was as good as or better than human diagnosticians at discovering bugs that explain a student's errors However, a third of the students who committed errors could not be modelled with bugs and slips Moreover, bugs were found in general to be unstable rather than stable, both in the short term and the long term These findings challenged the belief that bugs and slips alone could account for procedural error data Repair Theory was orginally developed as a generative theory of bugs, one that predicted which bugs would exist for a given procedural skill However, it also predicted that certain kinds of non-bug, non-slip performance would exist, both in the static analyses and the stability data GRA

N82-27982# Texas Christian Univ , Fort Worth Inst of Behavioral Research
ORGANIZATIONAL CLIMATE: ANOTHER LOOK AT A POTENTIALLY IMPORTANT CONSTANT
Lawrence R James 7 Apr 1982 35 p refs
(Contract N00014-80-C-0315, NR Proj 170-904)
(AD-A113953, IBR-82-4) Avail NTIS HC A03/MF A01 CSCL 05/10

Organizational climate is examined from the standpoint of the need to demonstrate interrater reliability (agreement) among individuals' perceptions of psychological climate It is shown that if prior estimates of interrater reliability are accurate, then organizational climate is a moot issue It is then demonstrated that at least some prior estimating procedures likely provided underestimates of interrater/perceptual agreement A new procedure for estimating interrater reliability is suggested and illustrated The new procedure provided substantially higher estimates of interrater reliability than prior methods It is concluded that the concept of organizational climate is potentially salvageable, although more attention needs to be given to the appropriate level of explanation for climate variables Author (GRA)

N82-27983# Texas Instruments, Inc , Dallas Central Research Labs
INTELLIGENT TUTORING FOR PROGRAMMING TASKS: USING PLAN ANALYSIS TO GENERATE BETTER HINTS Final Report, 30 Sep 1980 - 31 Dec. 1981
James R Miller, Thomas P Kehler, Paul R Michaelis, and William R Murray Mar 1982 117 p refs
(Contract N00014-80-C-0828 NR Proj 154-458)
(AD-A114020, TI-08-82-010, ONR-TR-0818F) Avail NTIS HC A06/MF A01 CSCL 05/9

This project has dealt with tutorial systems for computer programming languages, particularly, systems in which a student is trying to write a computer program and can, upon request, receive hints about errors in his program and ways he can correct these errors This research had two phases an experimental investigation of the interaction between a student and a hint-giving tutor and the construction of a tutorial system that identifies the plan underlying a student s program and gives hints that address errors in this plan In the experimental work an existing programming language tutor (BIP) was modified to allow students to request and receive hints from a human tutor These experiments suggested that (1) Programs are typically written in two stages layout of the basic design of the program and (2) correction of the statements that instantiate this design Systems that rely on 'canned hints do not provide adequate assistance for the complex problems faced by students Although BIP was able to give reasonable help on the syntactic form of language statements, it has no facilities for identifying and offering advice on problems with a program s design, in these experiments, students recognized this shortcoming and relied upon assistance from the human tutors GRA

N82-27984# Vanderbilt Univ , Nashville, Tenn Dept of Psychology
THE CONSTANCY OF STEREOSCOPIC DEPTH PERCEPTION
Robert H Cormack 12 Jan 1982 39 p refs
(Contract N00014-81-C-0001)
(AD-A111484) Avail NTIS HC A03/MF A01 CSCL 05/10

Depth constancy is said to occur when the apparent depth in a scene remains the same as viewing distance changes Studies of depth constancy have left unanswered questions regarding the range of viewing distances over which depth constancy can operate and the role of retinal disparity in preserving apparently constant depth In this study, stereoscopic after images were exploited to confront these questions After images containing depth information in the form of retinal disparity were produced and viewed at various fixation distances Apparent depth in the afterimage was measured by asking observers to set a depth probe equidistant to the after image This technique permitted holding retinal disparity constant as viewing distance changed It allowed testing at very large viewing distances in the presence of multiple depth cues The results indicate that stereoscopic depth constancy can be preserved at viewing distances at least as great as 27 meters (the largest used) These changes were veridical and demonstrate that the relationship between perceived depth and retinal disparity is consistent with the geometry describing stereopsis These findings set requirements for theories of depth constancy Specifically they demand that such theories show how retinal disparity can be correctly recalibrated on the basis of distance information available in the visual array Author (GRA)

N82-27985# Forschungsinstitut fuer Anthropotechnik, Bonn (West Germany)
DESIGN AND VALIDATION OF A TRACKING TEST FOR FORMING MATCHED GROUPS FOR CONTINUOUS TRACKING EXPERIMENTS
F D Pitrella and W Krueger Aug 1981 29 p refs In ENGLISH, GERMANY summary
(FB-49) Avail NTIS HC A03/MF A01 Fachinformationszentrum, Karslruhe West Germany DM 10

A tracking performance test was developed and used in forming matched groups The need for such a matching test and the advantages of matched groups over randomized groups of subjects in experimental designs are discussed as well as the preference for between-subjects over within-subjects designs Matching test reliability was measured (0 99) and predictive and matching validities were determined in a validation experiment Validation coefficients of 0 79 were obtained which are considerably higher than necessary to prefer matched groups to randomized groups The strategy used in developing this matching test is explained and may be useful to those who wish to develop their own matching tests for specific research purposes Author (ESA)

N82-27986*# United Technologies Corp , East Hartford, Conn
STUDY OF EVA OPERATIONS ASSOCIATED WITH SATELLITE SERVICES Final Report, Aug. 1981 - Jan. 1982
Jack O Nash and Richard D Wilde Apr 1982 176 p refs (Contract NAS9-16120)
(NASA-CR-167614, NAS 1 26 167614) Avail NTIS HC A09/MF A01 CSCL 05H

Extravehicular mobility unit (EMU) factors associated with satellite servicing activities are identified and the EMU improvements necessary to enhance satellite servicing operations are outlined Areas of EMU capabilities, equipment and structural interfaces, time lines, EMU modifications for satellite servicing, environmental hazards, and crew training are vital to manned

Eva/satellite services and as such are detailed Evaluation of EMU capabilities indicates that the EMU can be used in performing near term, basic satellite servicing tasks, however, satellite servicing is greatly enhanced by incorporating key modifications into the EMU The servicing missions involved in contamination sensitive payload repair are illustrated EVA procedures and equipment can be standardized, reducing both crew training time and in orbit operations time By standardizing and coordinating procedures, mission cumulative time lines fall well within the EMU capability S L

N82-27987*# National Aeronautics and Space Administration Marshall Space Flight Center, Huntsville, Ala

THE HUMAN ROLE IN SPACE

Stephen B Hall, George vonTiesenhausen, and Gary W Johnson Apr 1982 37 p refs

(NASA-TM-82482, NAS 1 15 82482) Avail NTIS HC A03/MF A01 CSCL 05H

Requirements for the future human role in space are considered Human tasks were divided into normal scheduled activities, unscheduled activities, and contingency activities A strawman mission model was developed Projections were made of crew size, mission duration, pressurized spacecraft volume, and power requirements Trends of human roles were likewise projected N W

N82-27988*# Purdue Univ , Lafayette, Ind Dept of Food, Nutrition and Horticulture

PLANT DIVERSITY TO SUPPORT HUMANS IN A CELSS GROUND-BASED DEMONSTRATOR

J M Howe and J E Hoff Jun 1982 51 p refs

(Grant NsG-2401)

(NASA-CR-166357 NAS 1 26 166357) Avail NTIS HC A04/MF A01 CSCL 05H

Factors that influence the human nutritional requirements envisioned in a controlled ecological life support system ground-based demonstrator and on bioavailability experiments of Ca, Fe and Zn are discussed The interrelationhip of protein and magnesium on Ca retention is also described Author

N82-27989# Army Natick Development Center, Mass Individual Protection Lab

DEVELOPMENT OF A MICROCLIMATE COOLING SYSTEM FOR COMBAT VEHICLES

Vincent D Iacona, Joseph S Cohen, Michael Kupcinskas, Diego Gorbea, and Joseph Fratantuono Feb 1982 33 p refs

(DA Proj 1G2-63747-D-669)

(AD-A112017, NATICK/TR-82/010, IPL-248) Avail NTIS HC A03/MF A01 CSCL 06/17

This report describes a study conducted at Yuma Proving Ground, Arizona Trained acclimated soldiers conducted simulated combat missions in a stationary M-1 tank, while wearing Chemical Biological (CB) clothing Physiological measurements, skin temperature, rectal temperature, heart beat rate and sweat production were continuously monitored In addition, the environmental parameters of wet bulb, dry bulb, and wet bulb globe temperature and wind velocity and relative humidity were recorded GRA

N82-27990# Hughes Aircraft Co , El Segundo, Calif Radar Systems Group

HOLOGRAPHIC LASER VISOR MOCK-UP Final Report

M J Chern, T L Dobbs, and G E Moss Jun 1981 66 p

(Contract N62269-79-C-0288)

(AD-A112422, HAC-REF-E6018) Avail NTIS HC A04/MF A01 CSCL 06/17

The goal of this program was to show that a holographic reflector added to a pilot's visor can provide laser eye protection which has advantages over that which can be provided by other means such as the addition to an absorbing dye GRA

N82-27991# Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div

REFERENCE BOOK FOR THE NITROGEN INDUSTRY WORKER, VOLUME 2

M A Minovich, Ye Ya Melnikov, V A Klevke, S D Fridmen, B P Melnikov, V F Sokolova, M I Kopyev, V A Ulina, T N Sharonova, I D Nefedova et al 19 Mar 1982 647 p refs Transl into ENGLISH of Spravochnik Azotchika (USSR), v 2, 1969 p 1-445

(AD-A113749, FTD-ID(RS)T-1465-80) Avail NTIS HC A99/MF A01 CSCL 07/10

Materials and equipment used in the production of nitric and of nitrogen fertilizers are discussed The physical chemical *properties of ammonium nitrate* calcium nitrate, potassium nitrate, sodium nitrate, sodium nitrite, ammonium sulfate, and carbamide are examined as well as of ammonia water, ammoniates, and liquid complex fertilizers Attention is given to the metals and alloys, and corrosion resistant and thermal insulating materials Compressors, pumps, and high pressure vessels are treated Heat and electrical engineering in the plant are considered Basic information on accident prevention in the nitrogen industry is provided in the form of tables A R H

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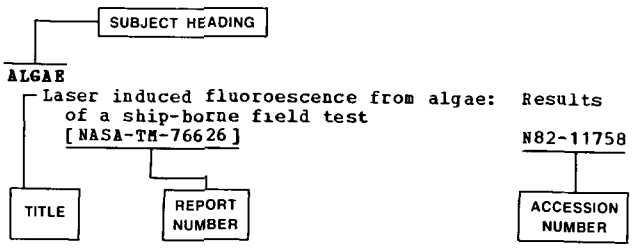

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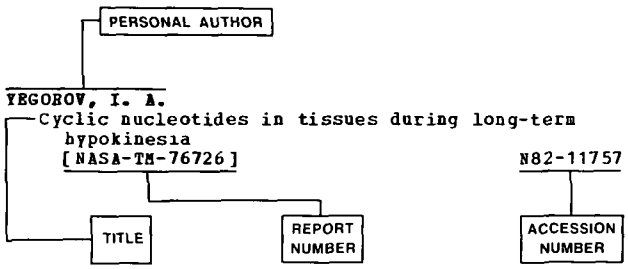

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